



9J CITY COUNCIL REPORT

SUBJECT: Work Order with ATC Group Services, LLC. for Closed Lincoln Landfill Ongoing Monitoring and Maintenance

SUBMITTED BY: Jennifer Hanson, Public Services Director

DEPARTMENT: Public Services

DATE: September 13, 2016

STRATEGIC RELEVANCE: Infrastructure

STAFF RECOMMENDATION(S):

Staff recommends City Council adopt a resolution authorizing the City Manager to: A). execute a Contract for Services with ATC Group Services, LLC. for the purpose of providing consulting services for the Closed Lincoln Landfill Ongoing Monitoring and Maintenance Project for a total amount not to exceed \$135,852 (10 percent contingency included) for a three year term (ending June 30, 2019) with the option to extend the contract for one-additional three year term and B). Augment the Fiscal Year (FY) 2016/2017 Solid Waste budget in Fund 730 in the amount of \$45,284.

BACKGROUND / INTRODUCTION:

The City has a need for a qualified firm to provide monitoring, reporting and maintenance at the City's Closed Lincoln Landfill. The Request for Proposal (RFP) was advertised publically on April 29, 2016 and proposals were due on May 27, 2016 at 3:00 PM. Four responses to the RFP were received from: ATC Group Services, LLC. (ATC), Applied Engineering and Geology, Inc. (AEG), Holdrege and Kull Consulting Engineers and Geologists (H&K), and GHD Services, Inc. (GHD).

The RFP required each firm to submit the following: a summary of consultant qualifications, discussion of project understanding and approach, a description of the consultant's quality assurance/quality control program, references, a description the proposed project team's individual team member experience, and an overview of current team workload analysis.

The scope of work required by the RFP included in summary: groundwater monitoring and sampling of existing monitoring wells, monitoring of the dewatering system, maintenance of the site, storm water monitoring, and compliance reporting. The monitoring and reporting required is mandated by three separate regulatory documents:

1. Waste Discharge Requirement (WDR) No. R5-2003-0142 which predominantly focuses on surface and groundwater sampling to identify any contaminants leeching from the closed landfill. In addition, this WDR includes a requirement to monitor and repair the clay cap covering the entire landfill site. Lastly, this WDR requires the City to maintain a 5 foot separation between the bottom of the waste trenches and the groundwater level.
2. Cleanup and Abatement Order (CAO) No. R5-2014-0703 that requires the City to implement a corrective action work plan and install additional monitoring wells.



Both items have been completed and accepted by the State Water Board, with the monitoring required by the Corrective Action Work Plan satisfying the requirements of the CAO.

3. Corrective Action Work Plan dated September 30, 2014. This document was the basis of design for the recently completed Closed Lincoln Landfill Corrective Action Work Plan construction project. The ongoing monitoring includes quarterly reporting of ground water levels, monthly water samples from the dewatering pumps and reporting of results to the Water Board.

FINDINGS/ANALYSIS:

The selection criteria outlined in the RFP consisted of the following:

- Project understanding & unique ideas (30pts)
- Experience of firm and specific staff including QA/QC (20 pts)
- References from former clients (20 pts)
- Completeness of the proposal and compliance with RFP (10 pts)

The qualifications were reviewed and rated by the panel which was comprised of Jennifer Hanson, Ray Leftwich, Roland Neufeld and Araceli Cazarez. Based on the criteria outlined in the RFP (re-stated above), the panel determined ATC Group Services, LLC. is the best qualified firm to perform the work.

ATC				
Criteria	Reviewer 1	Reviewer 2	Reviewer 3	Reviewer 4
A. Project Understanding and Ideas	30	26	20	25
B. Experience of Firm	18	20	16	18
C. References	19	20	20	18
D. Completeness and compliance of RFP	10	10	6	10
Total	77	76	62	71
Average Score				71.5

GHD				
Criteria	Reviewer 1	Reviewer 2	Reviewer 3	Reviewer 4
A. Project Understanding and Ideas	27	25	20	20
B. Experience of Firm	16	20	12	14
C. References	16	20	20	15
D. Completeness and compliance of RFP	8	10	6	8
Total	67	75	58	57
Average Score				64.25



AEG				
Criteria	Reviewer 1	Reviewer 2	Reviewer 3	Reviewer 4
A. Project Understanding and Ideas	28	30	30	22
B. Experience of Firm	16	20	20	17
C. References	16	10	10	15
D. Completeness and compliance of RFP	9	10	6	10
Total	69	70	66	64
Average Score				67.25

H&K				
Criteria	Reviewer 1	Reviewer 2	Reviewer 3	Reviewer 4
A. Project Understanding and Ideas	29	28	20	25
B. Experience of Firm	17	20	14	19
C. References	18	20	20	16
D. Completeness and compliance of RFP	10	10	6	10
Total	74	78	60	70
Average Score				70.5

The selection panel concluded that ATC's proposal received a high score for the following reasons:

- ATC demonstrated extensive knowledge of the City's landfill and monitoring requirements
- They are currently under contract with the City for the CAO and WDR reporting and are working with the Regional Board to try and reduce monitoring requirements
- They are working on numerous similar projects with positive reviews by other clients.

ATC's scope of work includes all compliance monitoring and reporting per the requirements listed above along with annual mowing, clay cap repairs, access road repairs and perimeter fence repairs as needed.

Each of the proposals included a cost estimate to complete the tasks included in the required scope of work.

Firm	Total Contract Cost
ATC	\$123,502
GHD	\$228,100
AEG	\$223,871.40
H&K	\$238,981

As shown above, there is a large discrepancy between the lowest cost proposal (ATC) and the cost associated with the other three proposals received. Due to this fact, staff



confirmed with ATC their understanding of the scope of work and received confirmation from ATC that they understood the scope of work and would be able to complete the required tasks for the cost provided.

CONCLUSION:

Staff recommends City Council adopt a resolution authorizing the City Manager to: A). execute a Contract for Services with ATC Group Services, LLC. for the purpose of providing consulting services for the Closed Lincoln Landfill Ongoing Monitoring and Maintenance Project for a total amount not to exceed \$135,852 (10 percent contingency included) for a three year term (ending June 30, 2019) with the option to extend the contract for one-additional three year term and B). Augment the Fiscal Year (FY) 2016/2017 Solid Waste budget in Fund 730 in the amount of \$45,284.

ALTERNATIVES:

1. Adopt a resolution authorizing the City Manager to: A). execute a Contract for Services with ATC Group Services, LLC. for the purpose of providing consulting services for the Closed Lincoln Landfill Ongoing Monitoring and Maintenance Project for a total amount not to exceed \$135,852 (10 percent contingency included) for a three year term (ending June 30, 2019) with the option to extend the contract for one-additional three year term and B). Augment the Fiscal Year (FY) 2016/2017 Solid Waste budget in Fund 730 in the amount of \$45,284.
2. Decline to adopt the proposed Resolution.
3. Provide staff with additional direction.

FISCAL IMPACT:

It is proposed to fund the contract from the Solid Waste Professional Services account 730-6865-50400-0349. The FY 16/17 Annual Budget did not include money for this effort; as such, the budget requires augmentation in the amount of \$45,284. The cost for future fiscal years will be presented to City Council for consideration during the routine budget process.

CITY MANAGER REVIEW OF CONTENT:

APPROVED AS TO LEGAL FORM:

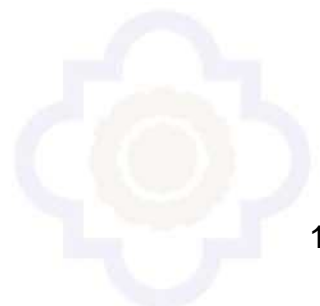
CONTRACT ACCOUNTABILITY:

Department: Public Services

Staff member: Jennifer Hanson

ATTACHMENTS:

Attachment A – Resolution
Attachment B – Request for Proposals
Attachment C – ATC Work Proposal
Attachment D – ATC Cost Proposal
Attachment E – Contract
Attachment D – Proposals from unselected firms





CONTRACT FOR SERVICES

THIS CONTRACT is made on September 13, 2016 by and between the CITY OF LINCOLN (“City”), and ATC Group Services, LLC (“Consultant/Contractor”).

WITNESSETH:

WHEREAS, the City desires a contract with ATC Group Services, LLC to provide consulting services for the Closed Lincoln Landfill Ongoing Monitoring and Maintenance Project for a three-year period, beginning FY 2016/2017 (September 13, 2016) and ending FY 2019/2020 (September 13, 2019), with the option to extend the contract for one additional three-year term, for a total contract amount not to exceed \$135,852 (10% contingency included).

WHEREAS, the Consultant/Contractor has presented a proposal for such services to the City, dated May 27, 2016, attached hereto and incorporated herein as **Exhibit A**, and is duly licensed, qualified and experienced to perform those services;

NOW, THEREFORE, the parties hereto mutually agree as follows:

1. SCOPE OF SERVICES:

A. Consultant/Contractor shall do all work, attend all meetings, produce all reports and carry out all activities necessary for the completion of the services described in **Exhibit A** (“Scope of Work”). This Contract and its exhibits shall be known as the “Contract Documents.” Terms set forth in any Contract Document shall be deemed to be incorporated in all Contract Documents as if set forth in full therein. In the event of conflict between terms contained in these Contract Documents, the more specific term shall control. If any portion of the Contract Documents shall be in conflict with any other portion, provisions contained in the Contract shall govern over conflicting provisions contained in the exhibits to the Contract.

B. Consultant/Contractor enters into this Contract as an independent contractor and not as an employee of the City. The Consultant/Contractor shall have no power or authority by this Contract to bind the City in any respect. Nothing in this Contract shall be construed to be inconsistent with this relationship or status. All employees, agents, contractors or subcontractors hired or retained by the Consultant/Contractor are employees, agents, contractors or subcontractors of the Consultant/Contractor and not of the City. The City shall not be obligated in any way to pay any wage claims or other claims made against Consultant/Contractor by any such employees, agents, contractors or subcontractors, or any other person resulting from performance of this Contract.

C. The Consultant/Contractor agrees it has satisfied itself by its own investigation and research regarding the conditions affecting the work to be done and labor and materials needed, and that its decision to execute this Contract is based on such independent investigation and research.



2. TERM OF CONTRACT:

A. The services of Consultant/Contractor are to commence upon execution of this Contract the City, and shall be undertaken and completed in accordance with the Schedule of Performance, attached hereto and incorporated herein by this reference as **Exhibit B**.

B. Consultant/Contractor's failure to complete work in accordance with the Schedule of Performance may result in delayed compensation as described in Section 3.

C. The City Manager or his or her designee may, by written instrument signed by the Parties, extend the duration of this Contract for a period equal to the original term of this Contract in the manner provided in Section 5, provided that the extension does not require the payment of compensation in excess of the maximum compensation set forth in Section 3, Compensation.

3. COMPENSATION:

A. The Consultant/Contractor shall be paid at the completion of services for the actual fees, costs and expenses for all time and materials required and expended, but in no event shall total compensation exceed \$135,852 (10% contingency included) for a three-year period (ending September 13, 2019) without City's prior written approval. The Scope of Work shall be charged to the Solid Waste Fund/Professional Services Account Fund: 730-6865-50400-0349.

B. Said amount shall be paid upon submittal of a monthly billing showing completion of the tasks that month. Consultant/Contractor shall furnish City with invoices for all expenses as well as for all materials authorized by this Contract. The invoices shall be submitted with the monthly billing. If Consultant/Contractor's performance is not in conformity with the Schedule of Performance, payments may be delayed or denied, unless the Consultant/Contractor's failure to perform in conformity with the Schedule of Performance is a documented result of the City's failure to conform to the Schedule of Performance, or if the Schedule of Performance is extended pursuant to Section 5.

C. If the work is halted at the request of the City, compensation shall be based upon the proportion that the work performed bears to the total work required by this Contract, subject to Section 4.

4. TERMINATION:

A. This Contract may be terminated by either party, provided that the other party is given not less than 30 calendar days' written notice (delivered by certified mail, return receipt requested) of intent to terminate.

B. The City may temporarily suspend this Contract, at no additional cost to City, provided that the Consultant/Contractor is given written notice (delivered by certified mail, return receipt requested) of temporary suspension. If City gives such notice of temporary suspension, Consultant/Contractor shall immediately suspend its activities under this Contract.



C. Notwithstanding any provisions of this Contract, Consultant/Contractor shall not be relieved of liability to the City for damages sustained by the City by virtue of any breach of this Contract by Consultant/Contractor, and the City may withhold any payments due to Consultant/Contractor until such time as the exact amount of damages, if any, due the City from Consultant/Contractor is determined.

D. In the event of termination, the Consultant/Contractor shall be compensated as provided for in this Contract, except as provided in Section 4.C. Upon termination, the City shall be entitled to all work, including, but not limited to, appraisals, inventories, studies, analyses, drawings and data estimates performed to that date in accordance with Section 7 hereof.

5. AMENDMENTS, CHANGES OR MODIFICATIONS:

Amendments, changes or modifications in the terms of this Contract may be made at any time by mutual written agreement between the parties hereto and shall be signed by the persons authorized to bind the parties hereto.

6. EXTENSIONS OF TIME:

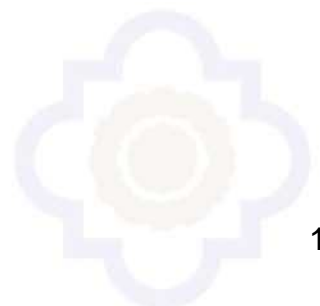
Consultant/Contractor may, for good cause, request extensions of time to perform the services required hereunder. Such extensions shall be authorized in advance by the City in writing and shall be incorporated in written amendments to this Contract or the attached Scope of Work in the manner provided in Section 5.

7. PROPERTY OF CITY:

A. It is mutually agreed that all materials prepared by the Consultant/Contractor under this Contract shall become the property of the City, and the Consultant/Contractor shall have no property right therein whatsoever. Immediately upon termination, the City shall be entitled to, and the Consultant/Contractor shall deliver to the City, all data, drawings, specifications, reports, estimates, summaries and other such materials as may have been prepared or accumulated to date by the Consultant/Contractor in performing this Contract which is not Consultant/Contractor's privileged information, as defined by law, or Consultant/Contractor's personnel information, along with all other property belonging exclusively to the City which is in the Consultant/Contractor's possession.

B. Additionally, it is agreed that the parties intend this to be a contract for services and each considers the products and results of the services to be rendered by Consultant/Contractor hereunder (the "Work") to be a work made for hire. Consultant/Contractor acknowledges and agrees that the Work (and all rights therein, including, without limitation, copyright) belongs to and shall be the sole and exclusive property of the City.

8. COMPLIANCE WITH ALL LAWS; PREVAILING WAGES:





A. Consultant/Contractor shall comply with all applicable laws, ordinances, and codes of federal, state and local governments, as applicable, and shall commit no trespass on any public or private property in performing any of the work authorized by this Contract. If necessary, it shall be City's responsibility to obtain all rights of way and easements to enable Consultant/Contractor to perform its services hereunder. Consultant/Contractor shall assist City in providing the same.

B. Some or all of the work herein may be a "public work" within the meaning of Labor Code section 1720, subject to the payment of prevailing wages under Labor Code sections 1720 et seq. Accordingly, Consultant/Contractor shall cause all such work, as applicable, to be performed as a "public work" in compliance with California prevailing wage laws, including the payment of prevailing wages, as applicable. In the event it is determined that the Consultant/Contractor is required to pay prevailing wages for the work performed under this Agreement, but failed to do so, the Consultant/Contractor shall pay all applicable penalties, costs, fees, wages, and wage differential. To the extent the project is subject to the requirement of payment of prevailing wages pursuant to California Labor Code sections 1720 et seq, then the project is subject to compliance monitoring and enforcement by the Department of Industrial Relations. Copies of the prevailing rate of per diem wages are on file at the City's offices, which shall be made available to any interested party on request. Consultant/Contractor shall cause a copy of the determination of the director of the prevailing rate of per diem wages to be posted at each job site, as well as all related notices required by applicable law and regulation.

9. WARRANTIES AND RESPONSIBILITIES - CONSULTANT/CONTRACTOR:

A. Consultant/Contractor agrees, represents and warrants to City that it has all licenses, permits, qualifications and approvals of whatever nature which are legally required for Consultant/Contractor to practice its profession and to properly provide the services set forth in **Exhibit A** in a manner which is consistent with the generally accepted standards of Consultant/Contractor's profession. Consultant/Contractor represents and warrants to City that Consultant/Contractor shall, at its sole cost and expense, keep in effect or obtain at all times during the term of this Contract any licenses, permits and approvals which are legally required for Consultant/Contractor to practice its profession at the time the services are performed.

B. Consultant/Contractor agrees and represents that the work performed under this Contract shall be in accordance with applicable federal, state and local law in accordance with Section 17.A hereof.

C. Consultant/Contractor shall designate a project manager who at all times shall represent the Consultant/Contractor before the City on all matters relating to this Contract. In the event that City, in its sole discretion, at any time during the term of this Contract, desires the removal of any person or persons assigned by Consultant/Contractor, including but not limited to the project manager, to perform services pursuant to this Contract, Consultant/Contractor shall remove any such person immediately upon receiving notice from City of the desire of City for the removal of such person or persons.





D. Except as set forth in **Exhibit D**, Consultant/Contractor shall, at its sole cost and expense, furnish all facilities, equipment, and other materials which may be required for furnishing services pursuant to this Agreement. City shall furnish to Consultant/Contractor only the facilities, equipment, and other materials listed in **Exhibit D** according to the terms and conditions set forth in **Exhibit D**.

E. Consultant/Contractor shall provide corrective services without charge to the City for services which fail to meet the above professional and legal standards and which are reported to Consultant/Contractor in writing within sixty (60) days of discovery. Should Consultant/Contractor fail or refuse to perform promptly its obligations, the City may render or undertake performance thereof and the Consultant/Contractor shall be liable for any expenses thereby incurred.

10. SUBCONTRACTING:

None of the services covered by this Contract shall be subcontracted without the prior written consent of the City, which will not be unreasonably withheld. Consultant/Contractor shall be as fully responsible to the City for the negligent acts and omissions of its contractors and subcontractors, and of persons either directly or indirectly employed by them, as it is for the negligent acts and omissions of persons directly employed by Consultant/Contractor.

11. ASSIGNABILITY:

Consultant/Contractor shall not assign or transfer any interest in this Contract whether by assignment or novation, without the prior written consent of the City which will not be unreasonably withheld. However, claims for money due or to become due to Consultant/Contractor from the City under this Contract may be assigned to a financial institution or to a trustee in bankruptcy, without such approval. Notice of any assignment or transfer whether voluntary or involuntary shall be furnished promptly to the City.

12. INTEREST IN CONTRACT:

Consultant/Contractor covenants that neither it, nor any of its employees, agents, contractors, subcontractors has any interest, nor shall they acquire any interest, direct or indirect, in the subject of the Contract, nor any other interest which would conflict in any manner or degree with the performance of its services hereunder. Consultant/Contractor shall make all disclosures required by the City's conflict of interest code in accordance with the category designated by the City, unless the City Manager determines in writing that Consultant/Contractor's duties are more limited in scope than is warranted by the category designated by the City code and that a narrower disclosure category should apply. Consultant/Contractor also agrees to make disclosure in compliance with the City conflict of interest code if, at any time after the execution of this Contract, City determines and notifies Consultant/Contractor in writing that Consultant/Contractor's duties under this Contract warrant greater disclosure by Consultant/Contractor than was originally contemplated. Consultant/Contractor shall make disclosures in the time, place and manner set forth in the conflict of interest code and as directed by the City.



13. MATERIALS CONFIDENTIAL:

All of the materials prepared or assembled by Consultant/Contractor pursuant to performance of this Contract are confidential and Consultant/Contractor agrees that they shall not be made available to any individual or organization without the prior written approval of the City, except by court order.

14. LIABILITY OF CONSULTANT/CONTRACTOR-NEGLIGENCE:

Consultant/Contractor shall be responsible for performing the work under this Contract in a manner which is consistent with the generally-accepted standards of the Consultant/Contractor's profession and shall be liable for its own negligence and the negligent acts of its employees, agents, contractors and subcontractors. The City shall have no right of control over the manner in which the work is to be done but only as to its outcome, and shall not be charged with the responsibility of preventing risk to Consultant/Contractor or its employees, agents, contractors or subcontractors.

15. INDEMNITY AND LITIGATION COSTS:

Consultant/Contractor shall indemnify, defend, and hold harmless the City, its officers, officials, agents, and employees and volunteers from and against any and all claims, damages, demands, liability, costs, losses and expenses, including without limitation court costs and reasonable attorneys' fees, arising in any manner by reason of negligent acts or negligent failure to act, recklessness, errors, omissions or willful misconduct incident to the performance of this Contract on the part of Consultant/Contractor except such loss or damage which was caused by the active negligence, sole negligence, or willful misconduct of the City. The provisions of this paragraph shall survive termination or suspension of this Contract.

16. CONSULTANT/CONTRACTOR TO PROVIDE INSURANCE:

A. Consultant/Contractor shall not commence any work before obtaining, and shall maintain in force at all times during the duration and performance of this Contract the policies of insurance specified in this Section. Such insurance must have the approval of the City as to limit, form, and amount, and shall be placed with insurers with a current A.M. Best's rating of no less than A:VII (or in the case of Worker's Compensation insurance, with the State Compensation Insurance Fund of California).

B. Prior to execution of this Contract and prior to commencement of any work, the Consultant/Contractor shall furnish the City with certificates of insurance and copies of original endorsements providing evidence of coverage for all policies required by the Contract. The endorsements shall be signed by a person authorized by the insurer to bind coverage on its behalf. The Consultant/Contractor agrees to furnish one copy of each required policy to the City, and additional copies as requested in writing, certified by an authorized representative of the insurer. The failure of Consultant/Contractor or of any of its contractors or subcontractors to maintain or renew coverage or to provide evidence of renewal may be treated by the City as a material breach of this Contract. Approval of the insurance by the City shall not relieve or decrease any liability of Consultant/Contractor.



C. In addition to any other remedy the City may have, if Consultant/Contractor fails to maintain the insurance coverage as required in this Section, the City may obtain such insurance coverage as is not being maintained, in form and amount substantially the same as is required herein, and the City may deduct the cost of such insurance from any amounts due or which may become due Consultant/Contractor under this Contract.

D. No policy required by this Contract shall be endorsed to suspended, voided, canceled, terminated by either party, or reduced in coverage or in limits unless the Consultant/Contractor has provided thirty (30) days' prior written notice by certified mail, return receipt requested, to the City.

E. Any deductibles, aggregate limits, pending claims or lawsuits which may diminish the aggregate limits, or self-insured retentions, must be declared to, and approved by, the City.

F. Aggregate Limits/Impairment.

If any of the insurance coverages required by this section contain annual aggregate limits, the Consultant/Contractor must give the City notice of any pending claim or lawsuit which may diminish the aggregate. The Consultant/Contractor must take steps to restore the impaired aggregates or provide replacement insurance protection. The City has the option to specify the minimum acceptable aggregate limit for each line of coverage required. No substantial reductions in scope of coverage which may affect City's protection are allowed without City's prior written consent.

G. The requirement as to types, limits, and the City's approval of insurance coverage to be maintained by Consultant/Contractor are not intended to, and shall not in any manner, limit or qualify the liabilities and obligations assumed by Consultant/Contractor under the Contract.

H. The Consultant/Contractor and its contractors and subcontractors shall, at their expense, maintain in effect at all times during the performance of work under the Contract not less than the following coverage and limits of insurance, which shall be maintained with insurers and under forms of policy satisfactory to the City. The maintenance by Consultant/Contractor and its contractors and subcontractors of the following coverage and limits of insurance is a material element of this Contract. The failure of Consultant/Contractor or of any of its contractors or subcontractors to maintain or renew coverage or to provide evidence of renewal may be treated by the City as a material breach of this Contract.

I. Worker's Compensation and Employer's Liability Insurance.

1. Worker's Compensation Insurance to protect the Consultant/Contractor, its contractors and subcontractors from all claims under Worker's Compensation and Employer's Liability Acts, including Longshoremen's and Harbor Worker's Act ("Acts"), if applicable. Such coverage shall be maintained, in type and amount, in strict compliance with all applicable state and federal statutes and regulations. The Consultant/Contractor shall execute a certificate of compliance with Labor Code Section 3700, on the form provided in the Contract Documents.



2. Consultant/Contractor shall provide a Waiver of Subrogation endorsement in favor of the City, its officers, officials, employees, agents and volunteers for losses arising from work performed by the Consultant/Contractor

J. Commercial General Liability Insurance

1. The insurance shall be provided on form CG0001, or its equivalent, and shall include coverage for claims for bodily injury or property damage arising out of premises/operations, products/completed operations, contractual liability, and subconsultant's work and personal and advertising injury resulting from actions, failures to act, or operations of the insured, or by its employees or agents, or by anyone directly or indirectly employed by the insured. The amount of insurance coverage shall not be less than \$1,000,000.00 per occurrence and \$2,000,000 general and products/completed operations aggregates.

2. The commercial general liability insurance shall also include the following:

a. Endorsement equivalent to CG 2010 1185 naming the City, its officers, officials, employees, agents, and volunteers as additional insureds. The endorsement shall contain no special limitations on the scope of protection afforded to the City, its officers, officials, employees or volunteers.

b. Endorsement stating insurance provided to the City shall be primary as respects the City, its officers, officials, employees and any insurance or self insurance maintained by the City, its officers, officials, employees or volunteers shall be in excess of the Consultant's insurance and shall not contribute with it, to the payment or satisfaction of any defense expenses, loss, or judgment.

c. Provision or endorsement stating that the Consultant's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

d. Provision or endorsement stating that any failure to comply with reporting or other provisions of the policies including breaches of representations shall not affect coverage provided to the City, its officers, officials, employees, or volunteers.

e. Provision or endorsement stating that such insurance, subject to all of its other terms and conditions, applies to the liability assumed by the Consultant/Contractor under the Contract, including, without limitation, set forth in Section 15, Indemnity and Litigation Costs.

K. Commercial Automobile Liability Insurance.

1. The commercial automobile liability insurance shall include, but shall not be limited to, protection against claims for death, bodily or personal injury, or property damage for owned, non-owned, and hired automobiles resulting from actions, failures to act, or operations of the insured, or by its employees or agents, or by anyone directly or indirectly



employed by the insured. The amount of insurance coverage shall not be less than \$1,000,000.00 per occurrence.

2. The commercial automobile liability insurance shall include the same endorsements as required for Commercial General Liability Insurance (16.J.2 above.)

L. Professional Liability.

The Consultant/Contractor and its contractors and subcontractors shall secure and maintain in full force, during the term of this Contract and for five years thereafter, professional liability insurance policies appropriate to the respective professions and the work to be performed as specified in this Contract. The limits of such professional liability insurance coverage shall not be less than \$1,000,000 per claim.

17. MISCELLANEOUS PROVISIONS:

A. Compliance With Laws. Consultant/Contractor shall keep itself fully informed of, shall observe and comply with, and shall cause any and all persons, firms or corporations employed by it or under its control to observe and comply with, applicable federal, state, county and municipal laws, ordinances, regulations, orders and decrees which in any manner affect those engaged or employed on the work described by this Contract or the materials used or which in any way affect the conduct of the work, including laws relating to prevailing wages pursuant to Labor Code section 1771 et seq.

B. Non-Discrimination. Consultant/Contractor shall not engage in unlawful employment discrimination. Such unlawful employment discrimination includes, but is not limited to, employment discrimination based upon a person's race, religious creed, color, national origin, ancestry, physical handicap, medical condition, marital status, gender, citizenship, or sexual orientation. Consultant/Contractor shall comply with Section 122(a) of the State and Local Fiscal Assistance Act of 1972.

C. Inspection of Records. Consultant/Contractor shall maintain and make available for inspection by the City and its auditors accurate records of all of its costs, disbursements and receipts with respect to any work under this Contract. Such inspections may be made during regular office hours at any time until six (6) months after the final payments under this Contract are made to the Consultant/Contractor.

D. Entirety of Agreement. This Contract constitutes the entire agreement between the parties relative to the services specified herein and no modification hereof shall be effective unless and until such modification is evidenced by a writing signed by both parties to this Contract. There are no understandings, agreements, conditions, representations, warranties or promises, with respect to this Contract, except those contained in or referred to in the writing.

E. Notices. All notices that are required to be given by one party to the other under this Contract shall be in writing and shall be deemed to have been given if delivered personally or enclosed in a properly addressed envelope and deposited in a United States Post Office for delivery by registered or certified mail addressed to the parties at the following addresses:



CITY:

Attn: City Manager
600 Sixth Street
Lincoln, CA 95648

CONSULTANT/CONTRACTOR: ATC GROUP SERVICES, LLC
915 Highland Pointe Drive, Suite 250
Roseville, CA 95678

F. Governing Law. This Contract shall be interpreted and governed by the laws of the State of California.

G. Venue. Any action arising out of this Contract shall be brought in Placer County, California, regardless of where else venue may lie.

H. Attorneys' Fees. In any action brought by either party to enforce the terms of this Contract, each party shall be bear responsibility for its attorney's fees and all costs regardless of whether one party is determined to be the prevailing party.

I. Counterparts. The parties may execute this Contract in two or more counterparts, which shall, in the aggregate, be signed by all the parties, each counterpart shall be deemed an original instrument as against any party who has signed it.

J. Severability. If any term, provision, covenant, or condition of this Contract is held by a court of competent jurisdiction to be invalid, void, or unenforceable, the remainder of the Contract shall remain in full force and effect and shall in no way be affected, impaired, or invalidated.





ATC Group Services LLC
915 Highland Pointe Drive, Suite 250
Roseville, CA 95678

CITY OF LINCOLN,
a municipal corporation

(Authorized Signature)

Matthew Brower, City Manager

Print Name

Dated

APPROVED AS TO FORM:

Leslie Walker, Interim City Attorney

Dated

ATTEST:

City Clerk

Dated

City Accountability:

Department responsible for contract:

Public Works Department

Staff responsible for contract:

Jennifer Hanson, Public Works Director





EXHIBIT A

SCOPE OF WORK

ATC Group Services LLC to provide consulting services for the Closed Lincoln Landfill Ongoing Monitoring and Maintenance Project for a three-year period, beginning FY 2016/2017 (September 13, 2016) and ending FY 2019/2020 (September 13, 2019), with the option to extend the contract for one additional three-year term.

(Please see attached proposal that includes the full list of services).





EXHIBIT B

SCHEDULE OF PERFORMANCE

ATC to provide consulting services for the Closed Lincoln Landfill Ongoing Monitoring and Maintenance Project for a three-year period, beginning FY 2016/2017 (September 13, 2016) and ending FY 2019/2020 (September 13, 2019), with the option to extend the contract for one additional three-year term, for a total contract amount not to exceed \$135,852 (10% contingency included).





EXHIBIT C

CERTIFICATE OF COMPLIANCE WITH LABOR CODE § 3700 Labor Code § 1861

I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract.

ATC Group Services LLC

By: _____
Title

Print Name

Date





EXHIBIT D

FACILITIES, EQUIPMENT, OTHER MATERIALS

Consultant/Contractor shall be responsible for providing all necessary facilities, equipment and personnel to undertake the necessary task(s) outlined in **Exhibit A**.





REQUEST FOR PROPOSALS
TO PROVIDE
ENGINEERING SERVICES ON THE
Closed Lincoln Landfill Monitoring Project
FOR THE
CITY OF LINCOLN
CITY ENGINEER DEPARTMENT

SUBMIT PROPOSALS TO:

CITY OF LINCOLN
ATTN: RAY LEFTWICH, P.E., CITY ENGINEER
600 SIXTH STREET
LINCOLN, CA 95648

Questions regarding this RFP may be directed to the City's Contract Project Manager - Travis Williams, at Travis.Williams@Lincolnca.gov.

Release Date: April 29, 2016
Questions Due: May 13, 2016
Submittal Deadline: 3:00 P.M. May 20, 2016





Request for Proposals to provide:

ENGINEERING SERVICES ON THE

Closed Lincoln Landfill Monitoring Project

I. DESCRIPTION OF THE PROJECT

The City of Lincoln Engineering Department (The City) is seeking written proposals from qualified firms to perform engineering services for the ongoing monitoring of the Closed Lincoln Landfill (Project). The selected consultant team must have knowledge and experience with monitoring, sampling and preparing reports for the Regional Water Quality Control Board (RWQCB) along with a depth of resources and understanding of local and regulatory issues associated with environmental compliance projects.

Project Description:

The City of Lincoln owns and maintains the Closed Lincoln Landfill located at the intersection of Virginiatown Road and Hungry Hollow Road, 0.4 miles east of the City of Lincoln, in Placer County, California. The Closed Lincoln Landfill encompasses approximately 6.3 acres and is nearly square shaped. The site is subject to California Regional Water Quality Control Board (RWQCB) Waste Discharge Requirements (WDRs) Order No. R5-2003-0142. The waste materials are covered with a minimum prescriptive standard final cover capping system. Since closure capping of the landfill, contaminants have been detected in both on-site and off-site monitoring wells. The on-site monitoring wells also showed that the underlying regional groundwater table periodically comes into contact with the waste materials. Based on these conditions the RWQCB issued Cleanup and Abatement Order (CAO) No. R5-2014-0703 to the City that requires a minimum of five feet of separation is maintained between the bottom of the Closed Lincoln Landfill waste materials and the underlying regional groundwater table. The CAO requires that groundwater beneath the waste trenches be maintained at an elevation of 184.6 feet msl. Both the WDR and CAO can be found online at http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=L10003287628.

In 2015, the City constructed an on-site perimeter dewatering trench system around the landfill waste materials. Construction of the system is documented in the Corrective Action Installation Report for the Closed Lincoln Landfill by Holdrege & Kull (H&K) dated October 30, 2015 and Report of Sump Repair by H&K dated December 14, 2015. The perimeter dewatering trench system continuously extracts groundwater to lower the local groundwater table to achieve the required minimum 5 foot separation between the bottom of the waste materials and the underlying groundwater table. The groundwater and contaminants extracted by the perimeter dewatering trenches are disposed into the City's sanitary sewer system via sump pumps and a pressure pipe conveyance system.

Ongoing operation and maintenance of the dewatering trench system is required to maintain compliance with the site WDRs and CAO. Operation and maintenance is to be conducted in accordance with the Corrective Action Work Plan by H&K dated



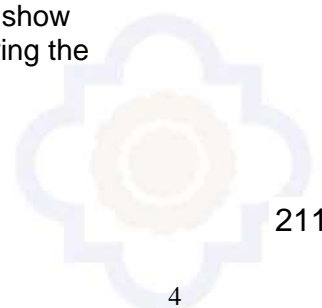
September 30, 2014 (Attachment B) and the Operations and Maintenance Manual for the site.

II. SCOPE OF SERVICES

1. Compliance Monitoring as required by WDR R5-2003-0142 including but not limited to:
 - a. Winterization Inspection and Report
 - i. Travel to the Site annually, prior to the rainy season but no later than September 30, to perform a Site inspection for the purpose of winterizing the Site. The inspection shall identify damage to the landfill cover, grade, precipitation and drainage controls, access roads, and other Site facilities. Coordinate with the City any needed repairs, then prepare a report documenting winterization activities.
 - b. Semi-Annual Monitoring and Reporting, Second Half 2016 through Second Half 2018
 - i. As required by the WDRs, Order Number R5-2003-0142, perform Semi-Annual Monitoring at the Closed Lincoln Landfill beginning with the Second Half of 2016 and continuing through the Second Half of 2018.
 - ii. Travel to the Site on a quarterly basis and collect depth to groundwater data. This data will be used to calculate groundwater gradient and direction of flow. Once during each Semi-Annual reporting period, purge all seventeen wells of a minimum of three well volumes (or until dry) while collecting temperature, pH, conductivity and turbidity readings of the purge water. The purge water will be disposed of into the City of Lincoln's sanitary sewer system. Water samples will be collected from all seventeen wells and the two surface water sampling points along Auburn Ravine. Samples will be analyzed as per the Monitoring and Reporting Program (MRP) of the WDRs.
 - iii. Upon receipt of the analytical data, a semi-annual report will be prepared including the following information:
 1. The results of groundwater elevation monitoring;
 2. Tabular summaries of corrective action monitoring data showing sampling dates, well constituents, concentrations, concentration limit, and units. The data shall be presented so as to clearly show historical concentrations at each well. The table shall also clearly show whether new monitoring data exceedances occurred during the monitoring period;



3. Contaminant contour maps of representative corrective action monitoring data, showing the estimated extent of the contaminant plume;
 4. Plots, graphical summaries and narrative discussion of the results of correction action monitoring;
 5. A compliance evaluation summary for the monitoring period;
 6. Field and laboratory tests sheets; and,
 7. An electronic copy of the data in PDF format.
- iv. Also included in this task are the costs necessary to comply with Assembly Bill 2886 (Uploading data into the GeoTracker data base).
- c. Semi-Annual Monitoring with the Constituents of Concern Five Year Report first half of 2019
- i. As required by the WDRs, Order Number R5-2003-0142, perform Semi-Annual Monitoring and Reporting for the Second Half of 2016 with the Constituents of Concern Five Year Report for all wells, existing and newly installed wells.
 - ii. Travel to the Site on a quarterly basis and collect depth to groundwater data. This data will be used to calculate groundwater gradient and direction of flow. Once during the second half of 2016, purge all 17 wells of a minimum of three well volumes (or until dry) while collecting temperature, pH, conductivity and turbidity readings of the purge water. Purge water will be disposed of into the City of Lincoln's sanitary sewer system. Collect water samples from the existing eleven wells and the two surface water sampling points along Auburn Ravine. Samples will be analyze as outlined in Attachment C in the Monitoring and Reporting Program (MRP) of the WDRs. In addition, samples collected of the six new wells will be analyzed for Constituents of Concern as outlined in Attachment D of WDRs Monitoring and Reporting requirements.
 - iii. Upon receipt of the analytical data, a semi-annual report will be prepared including the following information:
 1. A tabular summary of well information from the installation logs, including well name, top of casing elevation, total depth, depths/elevations of screened interval, and the soil type(s) over the screened interval;
 2. The results of groundwater elevation monitoring;
 3. Tabular summaries of corrective action monitoring data showing sampling dates, well constituents, concentrations, concentration limit, and units. The data shall be presented so as to clearly show historical concentrations at each well. The table shall also clearly show whether new monitoring data exceedances occurred during the monitoring period;





4. Contaminant contour maps of representative corrective action monitoring data, showing the estimated extent of the contaminant plume;
 5. Plots, graphical summaries and narrative discussion of the results of correction action monitoring;
 6. A compliance evaluation summary for the monitoring period;
 7. Field and laboratory tests sheets; and,
 8. An electronic copy of the data in PDF format.
- iv. The report will also include an Annual Monitoring Summary Report. The Annual Monitoring Summary Report will include a summary of the detection and corrective action monitoring results for the prior year and include a discussion of compliance with the WDRs. The report will include both tabular and graphical summaries of the prior year's monitoring data, including time series plots of historical monitoring data for each monitoring parameter/COC. For corrective action monitoring data, the report shall also include the following:
1. A tabular summary of well information from the installation logs, including well name, top of casing elevation, total depth, depths/elevations of screened interval, and the soil type(s) over the screened interval;
 2. A summary of the results of trend analysis performed on each constituent of the release during the prior year;
 3. A summary of the results of water chemistry analysis of water quality data collected during the prior year, including illustrative graphs and plots (i.e. Stiff diagrams, Trilinear plots; etc.); and,
 4. Contaminant contour maps for representative constituents (i.e. TDS and chlorides) constructed as part of semi-annual reporting during the prior year and a discussion as to whether the size of the plume has increased, decreased, or remained the same since the previous monitoring year.
- v. Also included in this task are the costs necessary to comply with Assembly Bill 2886 (Uploading data into the GeoTracker data base).

d. **Annual Maintenance**

- i. **Fire Break and Mowing (5 events).** As required by the Placer County Division of Environmental Health (County), the surface of the landfill is to be mowed on an as needed basis to minimize cover for rodents and reduce fire danger. The County is concerned that burrow holes created by the rodents could damage the integrity of the clay cap to the landfill, allowing leachate to migrate to groundwater. A majority of the landfill can be mowed using a commercial mower. However, the perimeter, berms and areas covered with cobbles have to be trimmed by hand. For the purposes of this proposal, assume the surface of the landfill will need to be mowed five times during each spring/summer season. **(Annual Allowance \$11,000.00)**
- ii. **Site Repairs as Required by the County.** Placer County performs routine inspections of the landfill and issues a report. This report documents any



deficiency that they believe needs to be addressed, including, perimeter fence repair, filling in of tire ruts and rodent holes, signage, etc. The selected consultant firm will meet with representatives from Placer County and Regional Board at the Site and perform reasonable Site repairs as requested and approved by the City. **(Annual Allowance \$4,000.00)**

- iii. Costs are estimated to cover simple repairs and maintenance. Significant and large scale repairs and maintenance (i.e. regrading the Site) are not to be included.
 - e. Conduct Storm Water Monitoring and Complete Reporting (2009-2010)
 - i. As required by the WDRs, Order Number R5-2003-0142, perform storm water monitoring at the Closed Lincoln Landfill. Inspect the Site monthly and during “normal business hours” following storm events during the rainy season. During the Site inspections, collect two sets of surface water samples (if available) for analysis.
 - ii. Prepare the Storm Water Pollution Prevention Plan (SWPPP) forms provided by the State Water Resource Control Board. Completed forms will be submitted to the Client for signature and submittal to the State Water Resource Control Board.
- 2. In addition to the requirements of WRD R5-2003-0142, the site requires monitoring in accordance with the CAO R5-2014-0703 and the Corrective Action Work Plan dated September 30, 2014. Monitoring includes but is not limited to:
 - a. Quarterly monitoring of the dewatering system includes three components: groundwater level measurement, groundwater sampling, and remote telemetry monitoring. Additional information regarding the quarterly monitoring which is not addressed in the following sections can be found in the Corrective Action Work Plan and the Corrective Action Installation Report for the Closed Lincoln Landfill.
 - b. Groundwater Level Measurement
 - i. The groundwater monitoring network consists of 17 groundwater monitoring wells as shown on Figure 2. Eight of the wells are situated within the property boundary with the remaining nine wells located around the site. There are also two dual nested piezometers located within the property boundary on the north and east sides and a sump structure located in each of the four corners of the site. Groundwater level data is to be collected in the four sumps, groundwater monitoring wells, and piezometers. In addition, at each sump structure, the totalized flow, number of pump starts, energy consumed, and total hours operated is to be collected.
 - c. Groundwater Quality Sampling
 - i. Groundwater samples are to be collected at each sump that discharged during the quarter. Samples are to be analyzed for total dissolved solids (TDS) a by a California certified laboratory by standard method 2540C. The laboratory shall have a current California Environmental Laboratory Accreditation Program (ELAP) certification.



d. Remote Telemetry Monitoring

- i. Weekly remote monitoring of the dewatering system is required. The purpose of the weekly monitoring is to verify that the pumps are operating within their pre-determined ranges and there is not a significant increase in water level. The telemetry information is accessed through Instrumentation Northwest's online database software.

e. Reporting

- i. An O&M report shall be prepared quarterly to document compliance with the WDRs and CAO. The report shall include all operational data, groundwater level data recorded for site monitoring wells and sumps, groundwater quality data, maintenance activities performed during the quarter, etc. The report must make an assessment of whether the groundwater elevation meets the compliance elevation of 184.6 feet msl. Reports are to be approved by a California licensed Professional Engineer or Geologist and completed in accordance with the CAO. Reports are due to the City for review five days prior to submittal to the RWQCB. Reports are due to RWQCB 30 days following the completion of the quarter (i.e., January 30, April 30, July 30, October 30). Reports shall be uploaded to Geotracker and emailed to the electronic mail box for the Central Valley Water Board's Sacramento office at centralvalleysacramento@waterboards.ca.gov

III. CONTRACT TIME

The selected firm will be required to begin sampling upon award of contract and will be responsible for generating the quarterly O&M report for the third quarter of the 2016 calendar year along with the second half semi-annual report for the 2016 calendar year. The contract will be for 3 years, with the selected firm responsible for all reporting through the second quarterly and first half semi-annual report of calendar year 2019.

IV. TASK ORDER

The selected Consultant will be issued a Task Order through the on-call professional services agreement.

No work is authorized and no payments will be made prior to execution of a Task Order

V. REQUIRED CONTENTS OF PROPOSAL

Submit three copies of the proposal. Proposals should be concise and specific to this RFP and limited to 10 single sided pages, excluding 1) the cover letter, 2) the cost proposal (in separate sealed envelope) and 3) full resumes and sample documents



(specifically described below) included in appendices. Proposals must be in the following format:

1. Consultant Identification and Qualifications:

Provide the legal name of the firm, the firm's mailing and physical address, the names and contact information of the legally responsible principal and the primary contact person (Project Manager) for this project. Provide a brief summary of the firm's (or team's) qualifications specific to this project.

2. Project Understanding and Approach:

Describe the unique overall approach and methodologies for this Project. Provide a more detailed description of the program to respond to each specific work element.

3. Quality Assurance/Quality Control (QA/QC):

Describe the team's established QA/QC program to be used throughout the Project. Provide the name, licenses and a brief bio of the person responsible for QA/QC

4. Related Project/Client Information:

Briefly describe three (3) comparable projects that best exhibit the firm's experience in each of the required services. Include the specific project name and location, overall project size and cost, consultant's contract value, client contact person, including title, organization, address, current telephone number and E-mail address.

5. Individual Staff Experience and Project Organization:

- i. Provide an organization chart showing the project manager and key staff members for the project.
- ii. Provide a brief bio of each key staff.
- iii. Provide a summary of each sub-consultant, their area of responsibility and percentage of the project cost.
- iv. Provide a realistic statement of current staffing workload commitments, additional resources of the firm, and ability of the firm(s) to respond to any request for additional or contingency services in a timely manner.
- v. Provide a statement that the departure, reassignment or substitution for any named member of the designated project team including subconsultant(s) will not be made without the prior written approval of the City.

6. Cost Proposal:

Include a cost estimate of all required services and associated fees in a separate document and sealed in an envelope entitled "**ENGINEERING SERVICES COST PROPOSAL - CLOSED LINCOLN LANDFILL MONITORING PROJECT**".

The cost proposal must:





- i. Be broken down by task and personnel category to indicate the level of effort and duration for each task,
- ii. Show one hourly rate for each personnel category necessary for each task. The hourly labor rate must include
 - the cost differential for night work or overtime work.
 - all costs for materials, supplies, mobile phone, housing, per diem and miscellaneous equipment necessary to meet the requirements and deliverables listed in the Scope of Services and the approved construction management plan.
 - annual escalation or inflation. (no annual escalation allowed)
- iii. Show a “not to exceed” total for each task.

7. **Exceptions**

List any exceptions to any portion of this RFP. The City will consider the exception(s) and may or may not reject the RFP as non-responsive.

8. **Appendices:**

Appendices may or may not be reviewed in detail. They will not count against the stated page limit and may include:

- i. auxillary/ancillary materials.
- ii. sample documents that exhibit the firm’s standard of documentation, such as sample field reports, lab reports, invoices and other relevant documents expected to be used during the Project.
- iii. Full resumes of key staff
- iv. Full project descriptions.

VI. **SUBMISSION OF THE PROPOSAL**

Submit three copies and a pdf on a DVD of the proposal in a sealed envelope complete with the project name noted on this RFP cover sheet and addressed to:

City of Lincoln Engineering Department
Attention: Ray Leftwich, P.E.
600 Sixth Street
Lincoln, CA 95648

PROPOSALS MUST BE RECEIVED at the time and date stated on the cover sheet of this proposal and at the aforementioned location. Proposals received after this time or at any other location will be deemed unresponsive and rejected.

VII. **CONSULTANT SELECTION PROCESS**

The City will evaluate and rank the proposals using the following scoring:





Project Understanding & unique ideas to enhance the project	30 Points
Experience of firm(s) and specific staff including QA/QC	20 Points
References from former clients	20 Points
Completeness and compliance with RFP format	10 Points
Total Points Possible	80 Points

Although not anticipated, at the discretion of the City, one or more of the top ranked teams may be interviewed based upon the relative ranking by total score. Interviews will be for the purpose of meeting the project team, discussion of the scope of work, and review of the factors considered in the preparation of the proposal. The teams may also be requested to provide further clarification of submitted materials and/or submit additional materials for consideration.

After the interviews and review of any additional requested materials, the City will begin negotiations with the prime consultant of the top ranked team.

All proposals may become public information subsequent to the On-Call Professional Services Agreement. The Proposer may describe any sensitive or potentially proprietary information in general terms.

The Proposal should reflect the most favorable terms available to the City, as the City may make award on the Proposal alone without interviews or any further contact with the Proposer.

VIII. SCHEDULE

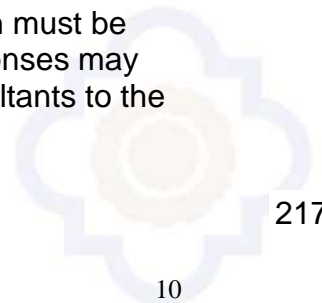
The City of Lincoln has designated the following activities and dates as key to the project schedule:

1.	RFP Issued	April 29, 2016
2.	Questions Due	May 13, 2016
3.	Proposal Due	May 20, 2016
4.	City Council Award of Contract	June 14, 2016
5.	Final Execution of Contract / Notice to Proceed	June 17, 2016

The City of Lincoln reserves the right to change the schedule.

IX. DOCUMENTS AND QUESTIONS

Direct any questions regarding this RFP to Travis Williams by Email at Travis.Williams@Lincolncalifornia.gov. All questions and requests for clarification must be received no later than 5 pm on the date noted in the timeline above. Responses may be provided via an Addendum. Do not contact any other City staff or consultants to the City.





Addenda to this RFP will be transmitted via E-mail to the short list consultants on the City's on-call list. Failure of the proposer to be aware of addenda or failure to return signed addenda with the Proposal in a timely manner as a complete responsive proposal may be cause for rejection at the sole discretion of the City. Verbal conversations with any person will not modify any term or obligation of this RFP.

X. Submittal instructions.

1. All proposals become the property of the City and will not be returned.
2. All costs for proposal preparation shall be borne by the Proposer.
3. The Proposer may withdraw the Proposal or correct a mistake in the Proposal prior to the Proposal deadline by submitting a withdrawal request or correction/addendum in writing. Oral communication will not be accepted.
4. Extra special bonus points will not be provided for high production value proposals with nifty glossy pictures and slick bindings. Please don't fill your proposals with fluff.

XI. ATTACHMENTS

Attachment A – Vicinity Map
Attachment B – Corrective Action Work Plan
Attachment C – Contract for Services





**Closed Lincoln Landfill Monitoring Project
Request for Proposals
ADDENDUM NO. 1
Revised Due date and Clarification**

Dated: May 17, 2016

Dear Plan Holders:

This Addendum forms a part of the RFP and modifies the original Documents as noted below. Please acknowledge Addendum #1 in the cover letter.

Notice is hereby given that the Request for Proposals for the Closed Lincoln Landfill Monitoring Project has been revised as follows:

ITEM

1	Revised Proposals Due Date: 3:00 PM, May 27, 2016
2	Request for Clarification: Question: In relation to the disposal of purge water from the wells, where is the disposal point? Response: There is no sanitary sewer access onsite. The selected firm will work with City Staff to identify a safe and convenient location to be used for discharge of purge water within City Limits.

Travis Williams, Contract Construction Manager

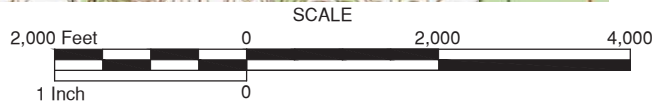
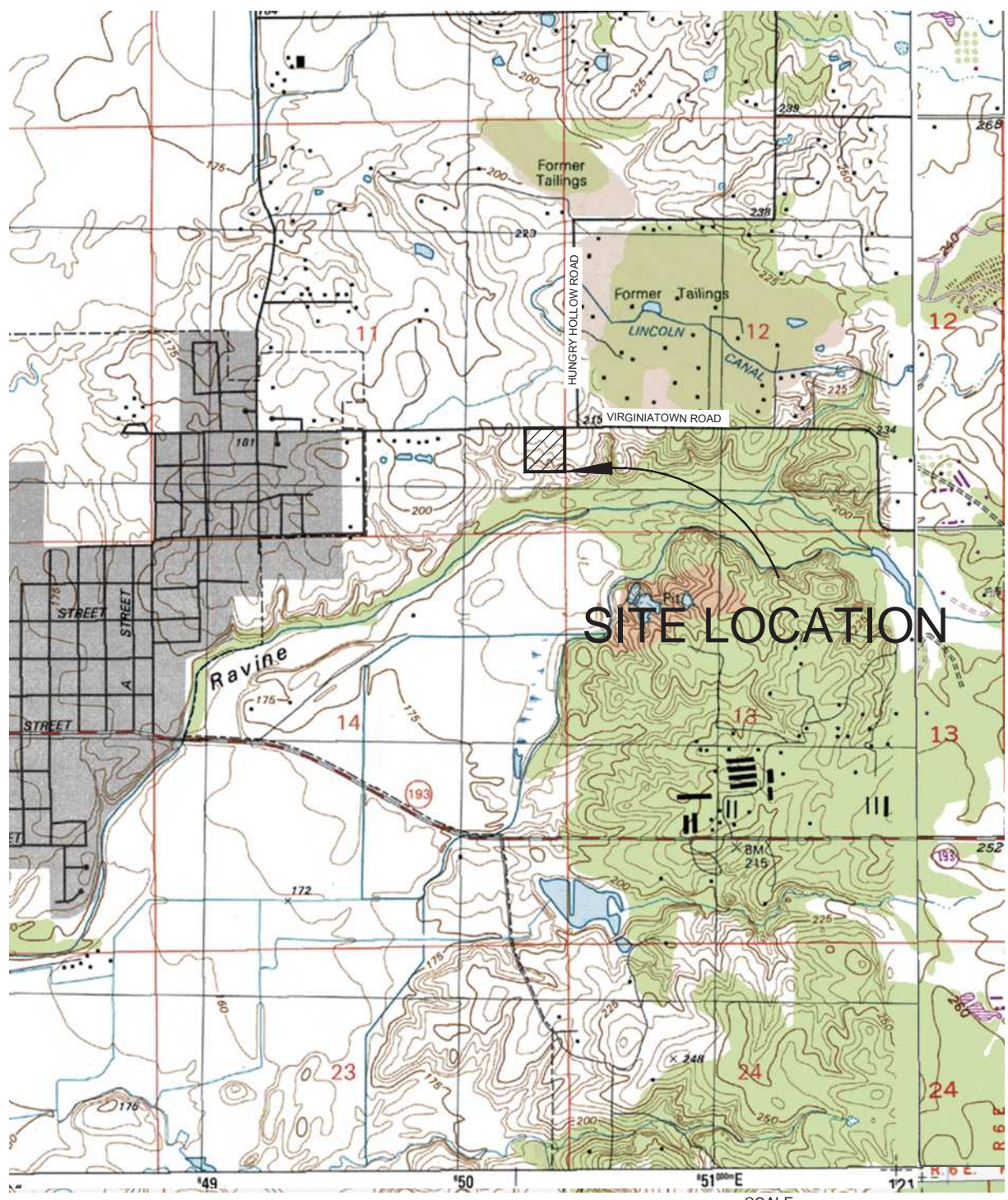
5-17-16

Date of Issuance

END OF ADDENDUM 1

City Hall
600 Sixth Street
Lincoln, CA 95648
(916) 434-2400
www.ci.lincoln.ca.us

Administrative Services - City Manager's Office - Development Services
Fire - Library - Recreation - Police - Public Services



Notes:



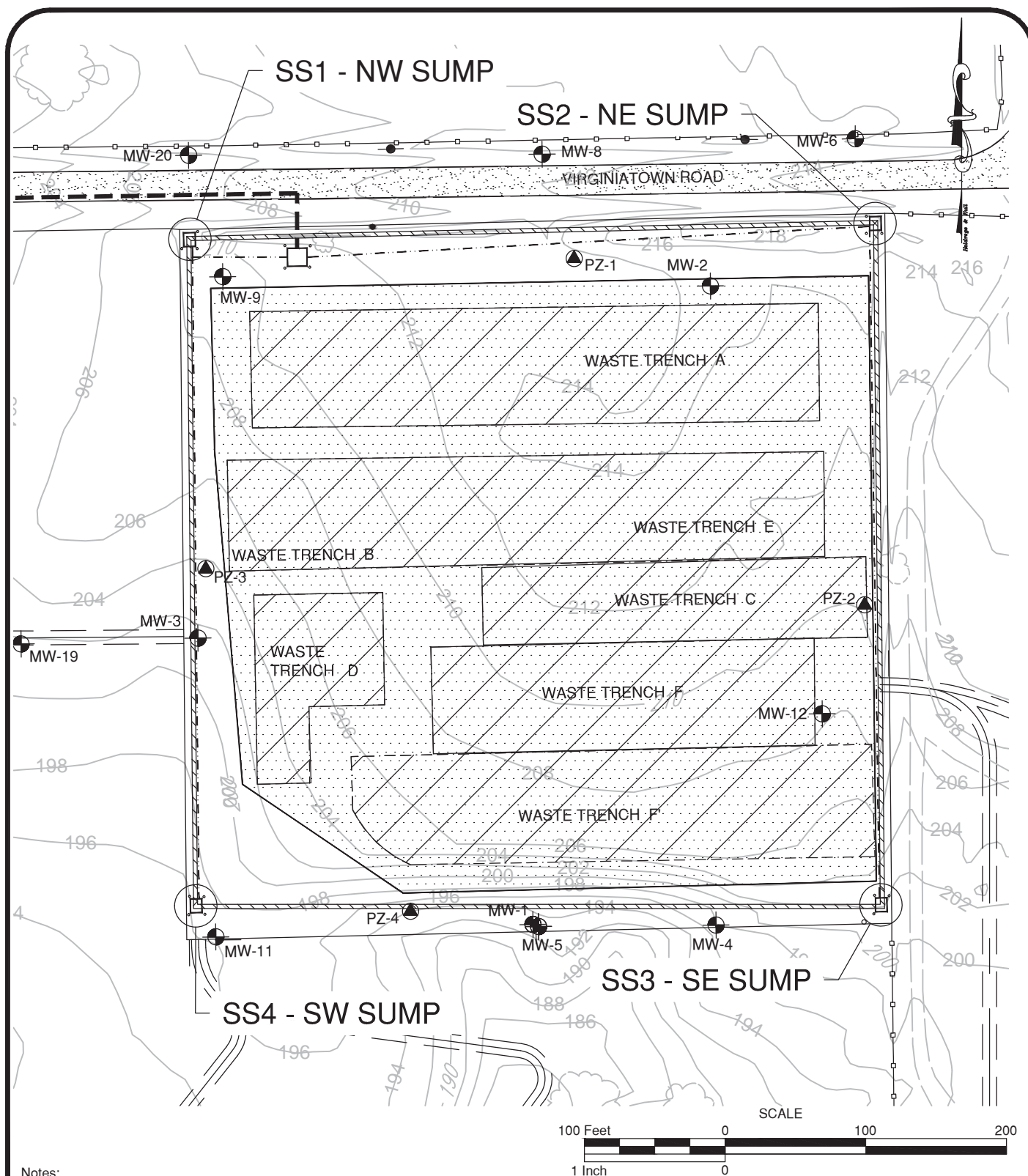
8 Seville Court, Suite 100
Chico, California, 95928
Phone 530-894-2487, Fax 530-894-2437

SITE LOCATION MAP
CLOSED LINCOLN LANDFILL
1120 VIRGINIATOWN ROAD
LINCOLN, PLACER, CALIFORNIA

DRAWN BY: HJC
CHECKED BY: DMO
PROJ. NO.: 70472-02
DATE: APRIL, 2016

FIGURE NO.:

1



Notes:



8 Seville Court, Suite 100
Chico, California, 95928
Phone 530-894-2487, Fax 530-894-2437

SITE MAP

Lincoln Closed Landfill
Perimeter Dewatering Trench
1120 Virginiatown Road
Lincoln, Placer County, CA

DRAWN BY: HJC

CHECKED BY: DMO

PROJ. NO.: 70472-02

DATE: APRIL, 2016

FIGURE NO.:

2

***CORRECTIVE ACTION WORK PLAN
CLOSED LINCOLN LANDFILL
Virginiatown Road
Lincoln, Placer County, California***

***Prepared for:
City of Lincoln Department of Public Services
600 Sixth Street
Lincoln, California 95648***

***Prepared by:
Holdrege & Kull
8 Seville Court, Suite 100
Chico, California 95928
Phone: 530-894-2487
Fax: 530-894-2437***

***Project No. 70472A-02
September 30, 2014***



September 30, 2014
Project No.: 70472A-02

Mr. Jon Crawford
City Engineer
City of Lincoln Department of Public Services
600 Sixth Street
Lincoln, California 95648

Reference: *Closed Lincoln Landfill*
Virginiatown Road
Lincoln, Placer County, California

Subject: *Corrective Action Work Plan*

Dear Mr. Crawford,

Holdrege & Kull (H&K) prepared the following *Corrective Action Work Plan (CAWP)* for the referenced site in Lincoln, Placer County, California that provides the details for construction of a cutoff trench dewatering system at the Closed Lincoln Landfill. The CAWP was prepared in response to *Waste Discharge Requirements Order No. R5-2003-0142* and *Cleanup and Abatement Order (CAO) No. R5-2014-0703* issued by the Regional Water Quality Control Board.

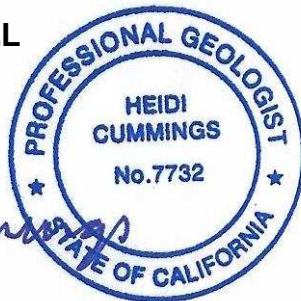
H&K appreciates the opportunity to provide environmental and engineering services for the City of Lincoln on this important project. If you have questions, comments, or need additional information, please contact the undersigned at 530-894-2487.

Sincerely,

HOLDREGE & KULL

Prepared by:

A handwritten signature in blue ink that reads 'Heidi Cummings'.



Heidi J. Cummings, PG 7732
Senior Geologist

Reviewed by:



Donald M. Olsen, PE 49514, CHG 271, CEG 1853
Principal Engineer

cc: City of Lincoln (2 copies)
RWQCB, Sacramento (1 copy)

TABLE OF CONTENTS

1	INTRODUCTION.....	1
1.1	Purpose and Objectives.....	1
1.2	Site Description.....	2
1.3	Conceptual Site Model.....	2
1.3.1	Site Geology.....	2
1.3.2	Site Hydrogeology	3
1.3.3	Constituents of Concern	3
2	SITE PREPARATION.....	5
2.1	Remove existing Perimeter fence	5
2.2	Protection of OnSite Groundwater Monitoring Wells.....	5
2.3	Abandon Groundwater Monitoring Well and Piezometers	5
3	PERIMETER DEWATERING TRENCH SYSTEM DESIGN.....	7
3.1	Perimeter Dewatering Trench.....	7
3.1.1	Trench Dimensions.....	7
3.1.2	Geotextile Fabrics.....	7
3.1.3	Washed Crushed Rock Backfill Material.....	8
3.1.4	Perforated Drain Pipe	8
3.1.5	Sump Structures.....	8
3.2	Conveyance Piping.....	9
3.2.1	Onsite Conveyance Piping	9
3.2.2	Offsite Conveyance Piping	9
3.3	Sump Pumps	10
3.4	Electrical Control Panel.....	10
4	DISPOSAL OF EXCAVATED SOIL.....	11
5	SYSTEM MONITORING, OPERATION, AND INSTRUMENTATION.....	12
5.1	System Startup Monitoring.....	12
5.2	Long Term Performance Monitoring	12
5.3	Groundwater Monitoring Well Network	13

TABLE OF CONTENTS (Continued)

5.4	Sump Pump Control and Automation	14
6	OPERATION AND MAINTENANCE MANUAL.....	16
7	EASMENTS AND PERMITS.....	17
7.1	Placer County Utility Encroachment permit.....	17
7.2	Stormwater Construction Permit	17
8	LIMITATIONS.....	18
9	REFERENCES.....	20

FIGURES

- 1 Site Location
- 2 Site Layout
- 3 Proposed Monitoring Well Location

TABLES

- | | |
|-------|---|
| 4.1-1 | System Startup Monitoring |
| 4.2-1 | Long Term System Monitoring |
| 4.3-1 | Level Control Pressure Transducer and Level Logger Depths |
| 4.3-2 | Level Logger Setup and Monitoring |
| 5.1-1 | System Startup Monitoring |
| 5.2-1 | Long Term System Monitoring |
| 5.4-1 | Level Control Pressure Transducer and Level Logger Depths |
| 5.4-2 | Level Logger Setup and Monitoring |

APPENDICES

- | | |
|---|--|
| A | Regulatory Correspondence |
| B | Conceptual Site Model |
| C | Monitoring Well Installation Work Plan |
| D | Construction Plans and Specifications |

ABBREVIATIONS AND ACRONYMS

AEG	Applied Engineering & Geology, Inc.
ASTM	American Society for Testing and Materials
bgs	below ground surface
CAO	Cleanup and Abatement Order
CAWP	Corrective Action Work Plan
CD	cross direction
cm/s	centimeter per second
COC	constituents of concern
CSM	conceptual site model
ft/ft	feet per foot
gal/min/ft ²	gallon per minute per foot
gpm	gallon per minute
HDPE	high density polyethylene
H&K	Holdrege & Kull
MD	machine direction
msl	mean sea level
NPDES	National Pollutant Discharge Elimination System
oz/yd ²	ounce per square yard
PVC	polyvinyl chloride
RWQCB	Regional Water Quality Control Board
SDR	standard dimension ratio
SF	safety factor
SM	silty sand
SVOC	semivolatile organic compound
TDS	total dissolved solids
UV	ultra violet
VOCs	volatile organic compounds
WDR	Waste Discharge Requirements

1 INTRODUCTION

This *Corrective Action Work Plan* (CAWP) for the Closed Lincoln Landfill documents the design of the cutoff trench dewatering system. The CAWP entails construction of groundwater cutoff trenches for dewatering the site and groundwater plume capture. Holdrege & Kull (H&K) developed this plan for the City of Lincoln under Contract No. 730-6865-50400.

The CAWP was developed in response to the *Waste Discharge Requirements Order* (WDR) No. R5-2003-0142 and *Regional Water Quality Control Board, Central Valley Region, Cleanup and Abatement Order R5-2014-0703 for City of Lincoln, Lincoln Landfill, Placer County* dated June 3, 2014. A copy of the Cleanup and Abatement Order (CAO) is provided in Appendix A.

1.1 PURPOSE AND OBJECTIVES

The objective of this effort is to prepare a design for a cutoff trench dewatering system that will:

1. Maintain the required minimum 5-feet of separation between the top of the water table and the lowest elevation of the waste located in Trench F at an elevation of 189.6 feet above mean sea level (msl). The perimeter dewatering cutoff trench system is designed to maintain the groundwater table at an elevation that is lower than 184.6 feet msl.
2. Provide source control and abate the groundwater plume and limit further offsite migration.
3. Discharge extracted groundwater and reduce the concentration of total dissolved solids (TDS) to a concentration less than the tolerance limit. TDS (and its constituent cations and anions) is the primary constituent of concern (COC) at the site. Appendix B, Table B-2 presents the range of TDS concentrations detected in site groundwater samples and the tolerance limit presented in the *Annual Monitoring Report, 2013* (CardnoATC, January 29, 2013).
4. Present a framework for groundwater monitoring and the collection of representative samples from existing site groundwater monitoring wells, one new groundwater monitoring well, and system discharge that includes frequency, analytical method, and method detection limits to evaluate the progress of dewatering and remediation of the groundwater contaminant plume.

5. Have above and below ground equipment, structures, and conveyance piping located on and offsite. Offsite conveyance piping will be in the public right-of-way.

1.2 SITE DESCRIPTION

The City of Lincoln owns and operates the Closed Lincoln Landfill, an unlined Class III landfill located approximately 0.4 miles east of the City of Lincoln at the intersection of Virginiatown Road and Hungry Hollow Road. The site covers 6.3 acres in the southeast $\frac{1}{4}$ of Section 11, Township 12 North, Range 6 East. The property is also identified as Placer County Assessor Parcel Number 021-231-019. The site location is presented in Figure 1.

1.3 CONCEPTUAL SITE MODEL

The design of the cutoff trench dewatering system is based on the geologic information and COCs presented in the updated conceptual site model (CSM). The CSM was last updated by H&K in the *Field Summary Report and Updated Conceptual Site Model, Closed Lincoln Landfill*, dated May 15, 2014. The updated CSM, provided in Appendix B, presents the hydrogeologic setting and contamination distribution for the Closed Lincoln Landfill. The CSM summarizes the currently available information on the geologic features, contaminant releases, migration pathways, potential receptors, and other information critical to understanding the hydrogeology and contamination and for focusing decision making.

1.3.1 Site Geology

The *Preliminary Geologic Map of the Sacramento 30' x 60' Quadrangle, California* (California Geological Survey, 2011) depicts the geology underlying the Closed Lincoln Landfill as Pleistocene age (0.01 to 2.6 million years before present) arkosic alluvial deposits of the Riverbank Formation. The Riverbank Formation in the vicinity of the site is composed of weathered reddish gravel, sand and silt. It is derived from plutonic rocks that lie to the east in the Sierra Nevada Range (Helley, Edward J., and Harwood, David S., 1985. *Geologic Map of Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1790*).

Lithologic information and laboratory test results reported by H&K in 2014 for samples obtained from the borings drilled for installation of piezometers PZ-1 through PZ-4 indicates that the site is underlain by silty sand (SM). Particle size percentages estimated in the field consist of 60 percent subangular, fine to medium grained sand and 40 percent low plasticity silt size particles. This soil is predominantly reddish yellow with a Munsel Color Chart designation of 7.5YR 7/8. This soil was dense to

very dense and dry to moist at the time of the investigation (February 2014). This soil is considered to have low permeability (1×10^{-4} to 1×10^{-5} centimeters per second [cm/s] C.W. Fetter, 2001. Applied Hydrogeology, Fourth Edition) as evidenced by the relatively slow seepage of groundwater into the borings during drilling. The presence of previously documented weathered granitic rock was not confirmed during drilling of the boreholes for PZ-1 through PZ-4 to the total depths explored. Notably different lithology was reported on the geologic log for well MW-17. The deposits consisted of clayey sand, poorly graded sand, and well graded sand indicative of recent alluvium laid down in the Auburn Ravine.

1.3.2 Site Hydrogeology

Groundwater is present within 5 feet of the bottom of the waste trenches and in a few locations intersects the trenches and may come in contact with waste materials. Geologic cross sections showing the depth of waste and maximum groundwater elevation are presented in Appendix B.

Groundwater beneath the site is present in the unconsolidated, low permeability sediments of the Riverbank Formation (except well MW-17 where groundwater was encountered in the recent alluvial deposits of Auburn Ravine). Historical depths to the water table range from approximately 1 to 32 feet below the top of well casings. Seasonal fluctuation of the potentiometric surface elevation in 16 of the site wells ranges from 2.54 feet to 15.38 feet. The water table elevation measured in MW-17 seasonally fluctuates up to 2.21 feet.

Historical groundwater gradients, calculated from site monitoring wells, ranges from 0.019 to 0.260 feet per foot (ft/ft) with a consistent overall south-southeast flow direction. However, there appears to be a groundwater ridge present on the west side of the site where groundwater flows in a southwesterly direction west of the property boundary and in a southeasterly direction east of the property boundary.

The average seepage velocity of the groundwater flowing within the vicinity of the waste trenches was estimated (from slug test data and the 2011 gradient) to have a geometric mean of approximately 1.7 feet per year. The seepage velocity estimated from MW-17 well data was unusually high at 385 feet per year; however, this value is likely due to the different lithology at this location and is considered to be an isolated data point (Applied Engineering & Geology, Inc. [AEG], 2013).

1.3.3 Constituents of Concern

The COCs in groundwater consist of general minerals, volatile organic compounds (VOCs), and semivolatile organic compounds (SVOCs). A summary of historical

groundwater monitoring results is provided in Appendix B. Groundwater monitoring data from 2006 through 2013 indicate the following:

- Concentrations of calcium, magnesium, potassium, sodium, chloride, nitrate as nitrogen, sulfate, TDS, and total alkalinity in down gradient wells consistently exceed the calculated concentrations limits or tolerance limits. Exceedance of the tolerance limit in down gradient wells is a violation of the WDRs.
- Seven different VOCs (toluene, styrene, carbon disulfide, tetrachloroethene, trichloroethene, cis-1,2-dichloroethene, and benzene) were detected in groundwater samples collected from site monitoring wells. A detection of a VOC is a violation of the WDRs.

2 SITE PREPARATION

Site preparation prior to construction of the onsite perimeter dewatering trench system will include removal of the existing perimeter security fence, abandoning several groundwater monitoring wells and piezometers that are within the dewatering trench construction alignment, and installation of temporary protective fencing around the remaining groundwater wells as described below.

2.1 REMOVE EXISTING PERIMETER FENCE

The existing fence that generally follows the property boundary shall be removed to accommodate work within the property. The existing fence consists of a chain-link fence and gate along the north boundary and barb wire fence and gates along the west, east, and south boundaries. A new perimeter security fence with locking gates will be installed along the property boundary upon completion of the construction.

2.2 PROTECTION OF ONSITE GROUNDWATER MONITORING WELLS

Temporary chain link fencing will be installed around existing onsite groundwater monitoring wells to provide protection during construction activities. Fencing will be installed around wells MW-1, MW-2, MW-4, MW-5, MW-6, MW-9, MW-11, and MW-12.

2.3 ABANDON GROUNDWATER MONITORING WELL AND PIEZOMETERS

Monitoring well MW-3 and piezometers PZ-3 and PZ-4 are to be properly abandoned, because they are either within the alignment of the perimeter dewatering trench or will be within the footprint of the excavating equipment used to construct the dewatering trench. Monitoring well MW-3 will be abandoned in place by pressure grouting the well casing. Pressure grouting will be accomplished by injecting grout down the well casing, capping the casing, and then applying a pressure of approximately 25 pounds per square inch to force the groundwater and grout out of the well screen and into the sand filter pack materials in the annular space between the well screen and formation soil. Upon completion of grouting the well, the casing will be cut off at approximately 2 feet below grade. Native soil will then be placed on top of the cut off casing to match the surrounding grades.

Abandonment of piezometers PZ-3 and PZ-4 will be accomplished by over-drilling the casings to the total depth of the piezometers. Following over drilling of PZ-3 and PZ-4, borehole abandonment will be accomplished by pumping a grout mixture consisting of 3 pounds of powdered nonbeneficiated bentonite and 7 gallons of water per 94-pound sack of Type II Portland cement. The grout shall be pumped through a 1- or 2-inch-diameter tremie pipe placed inside the auger flights. No more than

10 feet of casing shall be recovered in any one recovery. Reasonable effort shall be made to keep grout from falling below the bottom of the auger at any point during grouting operation. For PZ-3 grout will be pumped to within approximately 2 feet below ground surface (bgs). The remaining 2 feet will be backfilled with native soil, flush with the existing grade. Grout will be brought to the surface in PZ-4 because the upper 15 feet of PZ-4 will be excavated during construction of the perimeter dewatering trench.

3 PERIMETER DEWATERING TRENCH SYSTEM DESIGN

A perimeter dewatering trench system will be constructed generally along the property lines. The perimeter dewatering trench system is designed to lower the groundwater table to achieve a minimum of 5 feet of separation between bottom of the waste to the groundwater table surface. The lowest established bottom of waste was identified in Waste Trench F at an elevation of 189.6 feet msl. A minimum 5 foot of separation will require the groundwater table beneath the site to be lowered to an elevation of 184.6 feet msl. H&K designed the perimeter dewatering trench with a safety factor of 2 which will lower the groundwater table by another 5 feet to achieve an elevation of 179.6 feet msl.

The perimeter dewatering trench system design consists of the following components: 3-foot-wide perimeter trench of variable depth filled with clean crushed rock that is wrapped in a geotextile filter fabric, perforated drain pipe, sump structures and pumps installed within the dewatering trench at each of its four corners, onsite conveyance piping network, offsite conveyance piping, sanitary sewer inlet structure, electronic controls and remote monitoring system. These components are briefly described below and the detailed construction plans and specification are presented in Appendix D

3.1 PERIMETER DEWATERING TRENCH

The perimeter dewatering trench dimensions, and material components are described below.

3.1.1 Trench Dimensions

The perimeter dewatering trench will consist of four intersecting trench segments that will generally follow the four property boundaries of the square shaped property. Each trench segment is approximately 490-feet-long and will be approximately 3-feet wide. The depths below the existing ground surface will range from approximately 21.4 to 41.5 feet. The bottom of each trench will be graded from its mid point to drain to each intersection corner with a minimum 2 percent grade. The exterior edge of each trench segment will be located a minimum of 5 feet from the existing perimeter fence alignment as shown on the construction plans and specifications (Appendix D).

3.1.2 Geotextile Fabrics

Geotextile fabrics shall be used as a separation and filter medium around the dewatering trench crushed rock, and as a separation and stability medium beneath the perimeter gravel surfaced access road.

- **Dewatering Trench Geotextile:** A nonwoven geotextile filter fabric such as a Mirafi™ 160N or an approved equivalent shall be used to completely encapsulate (wrap) the clean crushed rock backfill material of each trench segment. The vertical geotextile seams will be overlapped a minimum of 3 feet. The horizontal geotextile seams will be overlapped at the top of each trench segment a minimum of 2 feet.
- **Perimeter Access Road Geotextile:** A woven geotextile such as a Mirafi™ 600X or an approved equivalent shall be used for constructing the onsite perimeter access road. The geotextile shall be placed directly on the compacted subgrade soil and pulled tight as practicable to remove wrinkles prior to placing and compacting the overlying Class 2 aggregate base (AB) rock materials.

3.1.3 Washed Crushed Rock Backfill Material

A clean 1-inch-minus crushed drain rock (Type C) shall be used to backfill each trench segment to within 3 feet of the existing ground surface. The crushed rock should be washed to produce an ASTM D422 test particle size distribution of 100 percent (by dry weight) passing the 1 inch sieve and 0 to 5 percent passing the No. 4 sieve and 0 to 3 percent passing the No. 200 sieve.

3.1.4 Perforated Drain Pipe

A minimum 4-inch-diameter, high density polyethylene (HDPE), perforated pipe with a standard dimension ratio (SDR) equal to $SDR = 26$ should be placed at the base of each trench segment inside the geotextile wrapped drain rock. The HDPE pipe connections should be fusion butt-welded together prior to placing in the trench. The drilled perforations shall be 1/4-inch-diameter. The perforations should be orientated in cross section view at 90 degrees to one another and along the pipe length on 6-inch-centers. The pipe should be placed such that the perforations are orientated at 45 degrees from the vertical. A minimum of 12 inches of drain rock should be placed below the perforated HDPE pipe. The pipe should direct water from the midpoint of each trench segment towards the corner sumps by gravity with a minimum 2 percent slope.

3.1.5 Sump Structures

The sump structures to be constructed at the intersections of each trench segment will consist of a deepened portion of the trench by a minimum vertical distance of 6 feet below the trench bottom. A minimum 8-inch-diameter, 0.25-inch-wall thickness solid low carbon steel casing with welded collars will be installed at each of the four sump locations. The bottom 10 feet of the sump casing will be a Type 304 SS WW, 0.040 inch wire wrap stainless screen with welded collars to allow groundwater to readily flow into the casing when pumped by the installed sump pump. The top of the sump will be enclosed in a 4-foot square by 4 feet deep concrete enclosure. The

concrete enclosure will be installed so that the top and bottom is set at a distances of 1 and 3 feet above and below the surrounding grades, respectively. The floor of the concrete enclosure will have perforation for the solid vertical sump casing. The vertical walls of the concrete enclosure will have perforations for the discharge pipe and pump wiring conduits. The top of the enclosure will consist of spring assisted horizontal metal doors to allow easy access to the sump pump installed in the sump casing.

3.2 CONVEYANCE PIPING

Groundwater extracted by each of the four sump pumps will be conveyed by an onsite underground pipe network to a below grade collection box where a manifold will direct the discharge into a single pipe that will convey the groundwater to an offsite sanitary sewer manhole for disposal. The onsite and offsite conveyance piping networks are described below.

3.2.1 Onsite Conveyance Piping

Each of the pumps at the bottom of the four sumps will convey the extracted groundwater through 1.25-inch-diameter Schedule 80 polyvinyl chloride (PVC) pipes to a concrete collection box where the pipes will be attached to a PVC collection manifold that will direct the groundwater into a single PVC pipe. Prior to entering the collection manifold, each sump pipe will have an inline backflow prevention valve, a shutoff valve, sampling spigot, and a flow meter installed. The onsite conveyance pipes will be installed in minimum 12-inch-wide trenches at a minimum depth of approximately 4 feet bgs. A minimum of 3 and 12 inches of crushed rock backfill shall be placed below and above the conveyance pipes, respectively. The remainder of the trench shall be backfilled to the surface with native soil compacted to achieve a minimum relative compaction of 90 percent of the ASTM D1557 maximum dry unit weight (density). A detection wire and warning tape shall be placed on top of the crushed rock backfill prior to placing and compacting the overlying native soil backfill. T-posts shall be installed at each turning point along each conveyance pipe to identify its below ground location. The alignments of the onsite conveyance pipes shall be located by a California licensed land surveyor.

3.2.2 Offsite Conveyance Piping

The offsite conveyance pipe will be installed in the center of the eastbound lane of Virginiatown Road where it will finally enter an existing manhole located approximately 950 feet west of the Closed Lincoln Landfill property. The offsite conveyance pipe will exit the concrete collection box as a 2-inch-diameter Schedule 80 PVC pipe. The offsite conveyance pipe will be installed in minimum

12-inch-wide trench at a minimum depth of approximately 4 feet bgs. A minimum of 3 and 12 inches of crushed rock backfill shall be placed below and above the conveyance pipe, respectively. The remainder of the trench shall be backfilled to the surface with native soil compacted to achieve a minimum relative compaction of 90 percent of the ASTM D1557 maximum dry unit weight (density). A detection wire and warning tape shall be placed on top of the crushed rock backfill prior to placing and compacting the overlying native soil backfill.

3.3 SUMP PUMPS

Installed in each sump will be a variable discharge Grundfos Redi-Flo3™, 220 volt pump. The discharge from each pump can be adjusted from approximately 2 to 30 gallons per minute (gpm). The pump connects directly to 1.25 inch outside diameter threaded pipe.

3.4 ELECTRICAL CONTROL PANEL

Each sump pump will be connected to a weatherproof central electrical control panel. The control panel will be equipped with telemetry that will allow City personnel to monitor the performance of each sump pump. A 220 volt electrical bus and master breaker will be installed in the control box. Each pump will have an individual circuit breaker box that will be connected to the master breaker bus terminal. A Grundfos GO MI301Remote (MI301) module will also be installed on the control panel. The MI301 uses built-in infrared and radio communication equipment to record and broadcast water level data recorded by pressure transducers installed in each well.

4 DISPOSAL OF EXCAVATED SOIL

Soil spoils generated during excavation of the groundwater cutoff trenches, offsite conveyance pipe trench, sump structures and any other construction activities will be disposed at an appropriately permitted facility. Waste profiling will be conducted in accordance with the permitted facility requirements. The following facilities have been identified for waste disposal activities.

Nonhazardous wastes may be disposed at the Class II Recology Ostrom Road Sanitary Landfill in Wheatland, California, approximately 20 miles from the site. Waste acceptance criteria (sample quantities and laboratory analyses) along with their Waste Disposal Application are posted on their Web site at: <http://www.recologyostromroad.com/>.

Hazardous waste may be disposed at the Chemical Waste Management Facility in Arlington, Oregon operated by Waste Management, Inc. This facility is approximately 600 miles from the site and is the nearest hazardous waste facility to the site. Waste profiling and waste acceptance criteria must be confirmed with Waste Management, Inc. The waste disposal application process is found on their Web site at: <http://www.wmsolutions.com/solutions/>. Analytical results generated from the Recology Ostrom Road waste profiling process will likely be useable by Waste Management for determining waste acceptance.

5 SYSTEM MONITORING, OPERATION, AND INSTRUMENTATION

Groundwater monitoring at site wells and discharge sampling from the dewatering trench system will be required during the system startup and routine operation. Groundwater level data will be used to evaluate whether the system is achieving the required 5-foot separation between the deepest portion of the waste and the top of the water table. Groundwater analytical results will be used to evaluate the mass of contaminants removed in groundwater and cleanup of the offsite portion of the groundwater contaminant plume.

5.1 SYSTEM STARTUP MONITORING

During the first three weeks of system startup and optimization, the frequency of groundwater level monitoring and discharge sampling from the dewatering trench system will be on a weekly basis. A summary of monitoring locations, frequency, and monitoring parameters is presented Table 5.1-1.

Table 5.1-1 System Startup Monitoring

Location	Frequency	Duration	Monitoring Parameter
System Discharge	Weekly	First 3 weeks after startup	Total Dissolved Solids by SM 2540C
Site Wells	Weekly	First 3 weeks after startup	Groundwater Level
Site Wells	Monthly	Months 2 and 3 after startup	Groundwater Level

5.2 LONG TERM PERFORMANCE MONITORING

Under the current site monitoring plan, depth to groundwater in the 17 site wells is measured on a quarterly basis and groundwater samples are collected for laboratory analyses on a semiannual basis. The current monitoring plan is considered to be sufficient for evaluating the effectiveness of the cutoff trench dewatering system. Discharge from the cutoff trench dewatering system will be sampled on a quarterly basis concurrent with the site monitoring wells. A summary of the monitoring locations, frequency, and monitoring parameters is presented below.

This monitoring schedule is subject to change based on regulatory requirements.

Table 5.2-1 Long Term System Monitoring

Location	Frequency	Duration	Monitoring Parameter
System Discharge	Quarterly	life of system	Total Dissolved Solids by Standard Method 2540C
Site Wells	Quarterly	life of system	Groundwater Level
Site Wells	Semiannual	life of system	Monitoring Parameters listed in WDR R5-2003-142

5.3 GROUNDWATER MONITORING WELL NETWORK

The groundwater monitoring well network currently consists of 17 groundwater monitoring wells as shown on Figure 2. Eight of the wells are situated within the property boundary of the site including: two upgradient wells (MW-2 and MW-9), two side gradient wells (MW-3 and MW-12), and four down gradient wells (MW-1, MW-4, MW-5 and MW-11) along the south property boundary. In addition, there are currently four dual nest piezometers (PZ-1 through PZ-4) within the property boundary. Construction of the groundwater cutoff trenches will require destruction of well MW-3 and piezometers PZ-3 and PZ-4. Construction of the cutoff trenches will also result in wells that are interior and exterior of the cutoff trenches. Exterior wells will consist of MW-1, MW-4, MW-5, and MW-11 and interior wells will consist of MW-2, MW-9, and MW-12.

Monitoring well MW-12 is closest to the deepest portion of the waste in Waste Trench F and its depth is sufficient to monitor the 5-foot separation zone and the compliance elevation of 186.4 feet msl. The bottom elevation of MW-12 is approximately 173 feet msl. Similarly wells MW-2 and MW-9 are deep enough for monitoring the 5-foot separation zone with bottom elevations of 170 and 174 feet msl, respectively. These wells are in close proximity to the dewatering trench (i.e., within 35 feet) and groundwater levels near the dewatering trenches are expected to show significant lowering.

As presented in the *Field Summary Report and Updated Conceptual Site Model*, (H&K, 2014), H&K used an application of the Dupuit Theory of unconfined flow to dewatering trenches to estimate the maximum height (h_{max}) of the water table above an impermeable boundary. The Dupuit Theory of unconfined flow is a closed form analytical model. Documentation of the analytical model is found in *Groundwater and Seepage*, by M.E. Harr, 1962, pp 43-44. The h_{max} value was then used to estimate trench depth adjacent to the deepest portion of the waste present in Waste Trench F situated on the southern side of the landfill property.

There is inherent uncertainty in the estimated boundary conditions used in the analytical model. Boundary conditions consist of: infiltration through the landfill cap, soil permeability, and depth to an impermeable boundary. This uncertainty results in a level of uncertainty associated with the model output (i.e., the height of the water table above the impermeable boundary).

In order to evaluate whether the system is achieving the predicted water table height above an impermeable boundary, one additional groundwater monitoring well (designated MW-21) will be constructed near the center of the landfill as shown on Figure 3. The groundwater level data collected from this well will be used to assess separation between the bottom of waste compliance elevation of 184.6 feet msl and the top of the water table. A work plan that describes the well design and field activities associated with well construction is provided in Appendix C.

5.4 SUMP PUMP CONTROL AND AUTOMATION

Groundwater water levels in site sump structures will be maintained at elevations to achieve the required 5 feet of separation from the deepest portion of the waste. The deepest portion of the waste is present in Waste Trench F at an approximate elevation of 189.6 feet msl, therefore groundwater elevation beneath the site is not to exceed 184.6 feet msl. Each of the sump structures will be fitted with a pump and automated pressure transducer level control that will maintain groundwater level at the site. In addition, the sump structures will be fitted with a pressure transducer (level logger) with remote communication (telemetry) that is dedicated to monitoring the water level. The data from this level logger will be accessed remotely over the cellular network and used to assess pump operational status and reduce response time in the event of a pump failure.

Approximate ground surface elevations at each sump structure and high and low water level within the sump structure is listed below in Table 5.4-1. The high and low water levels will be used for initial setup of the level control pressure transducers that will operate the pump and data from the level loggers will be compared to the high water level to assess pumping operations. The level loggers will be programmed to collect data at the frequency listed below and monitoring of the level logger data will be conducted periodically as defined in Table 5.4-2.

Table 5.4-1 Level Control Pressure Transducer and Level Logger Depths

Sump Structure ID	Location	Total Depth of Sump (feet)	Approximate Surface Elevation (feet msl)	Depth of Pump Bottom (feet)	Depth of Low Level Control Transducer (feet)	Depth of High Level Control Transducer (feet)	Depth of Level Logger with Remote Telemetry (feet)
SS1	NW Corner	42	209.0	40.5	38	29.4	41.5
SS2	NE Corner	50	216.5	48.5	46	36.9	49.5
SS3	SE Corner	35	202.0	33.5	31	22.4	34.5
SS4	SW Corner	30	196.0	28.5	26	16.4	29.5
msl = mean sea level				SE = southeast			
NE = northeast				SW = southwest			
NW = northwest							

Table 5.4-2 Level Logger Setup and Monitoring

When	Duration	Frequency	No. of Data Points per Day	Data Retrieval Frequency
System Startup	Week 1	3 hour interval	8	Daily
System Startup	Week 2 and 3	3 hour interval	8	Weekly
Life of System	Week 4 and ongoing for life of system	6 hour interval	4	Monthly

6 OPERATION AND MAINTENANCE MANUAL

An Operation and Maintenance (O&M) manual, which includes, system (pumps/controls) and vendor specific guidelines, must be provided by the construction contractor.

- The O&M manual should include the following:
- Manual for all system components
- O&M information for the operating personnel, including system description
- Startup and shutdown procedures
- Description and schedule of normal O&M tasks
- Indicators of system performance and/or maintenance

7 EASEMENTS AND PERMITS

The dewatering trenches are located approximately 5 feet from the site property boundary. The site is bound by private land on the west, east, and south sides and public land on the north side. Construction activities will not encroach on the privately owned adjacent parcels. Therefore it is not anticipated that the City will need to obtain construction easements from adjacent property owners.

7.1 PLACER COUNTY UTILITY ENCROACHMENT PERMIT

A Utility Encroachment Permit will be required for construction in public right of way on Virginiatown Road. It is expected that the contractor will obtain the required Utility Encroachment Permit from Placer County.

7.2 STORMWATER CONSTRUCTION PERMIT

Dischargers whose projects disturb one or more acres of soil are required to obtain coverage under the State Water Resources Control Board *National Pollutant Discharge Elimination System* (NPDES) *General Permit for Discharges of Storm Water Associated with Construction Activity Construction General Permit Order 2012-00006-DQWQ* (CGP). Construction activity subject to this permit includes clearing, grading and disturbances to the ground such as stockpiling, or excavation.

The City of Lincoln will maintain permit coverage under the CGP for the duration of this construction project. The City of Lincoln will determine the Risk Level (I, II, or III) for the site and prepare an appropriate Storm Water Pollution Prevention Plan and other permit required documents for approval by the RWQCB. The construction contractor will be required to implement the provisions of the approved SWPPP. The City will conduct the required inspections and reporting in accordance with the approved SWPPP.

8 LIMITATIONS

The following limitations apply to the findings, conclusions and recommendations presented in this report:

1. H&K's professional services were performed consistent with the generally accepted hydrogeologic and geotechnical engineering principles and practices employed in northern California. No warranty is either expressed or implied.
2. H&K provided engineering services for the site project consistent with the work scope and contract agreement presented in H&K's proposal and agreed to by H&K's client. The findings, conclusions and recommendations presented in this report apply to the conditions existing when H&K performed H&K's services and are intended only for H&K's client, purposes, locations, time frames, and project parameters described herein. H&K is not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to completing H&K's services. H&K does not warrant the accuracy of information supplied by others, or the use of segregated portions of this report. This report is solely for the use of H&K's client unless noted otherwise. Any reliance on this report by a third party is at the party's sole risk.
3. If changes are made to the nature or design of the project as described in this report, then the conclusions and recommendations presented in this report should be considered invalid by all parties. The validity of the conclusions and recommendations presented in this report can only be made by H&K; therefore, H&K should be allowed to review all project changes and prepare written responses with regards to their impacts on H&K's conclusions and recommendations. However, additional fieldwork and laboratory testing may be required for us to develop any modifications to H&K's recommendations. The cost to review project changes and perform additional fieldwork and laboratory testing necessary to modify H&K's recommendations is beyond the scope-of-services presented in this report. Any additional work will be performed only after receipt of an approved scope-of-work, budget and written authorization to proceed.
4. The analyses, conclusions and recommendations presented in this report are based on the site conditions as they existed at the time H&K performed the surface and subsurface field investigations. H&K has assumed that the subsurface soil and groundwater conditions encountered at the location of the subsurface exploratory locations are generally representative of the subsurface conditions throughout the entire project site. However, if the actual subsurface conditions encountered during construction are different than those described in

this report, then H&K should be notified immediately so that we can review these differences and, if necessary, modify H&K's recommendations.

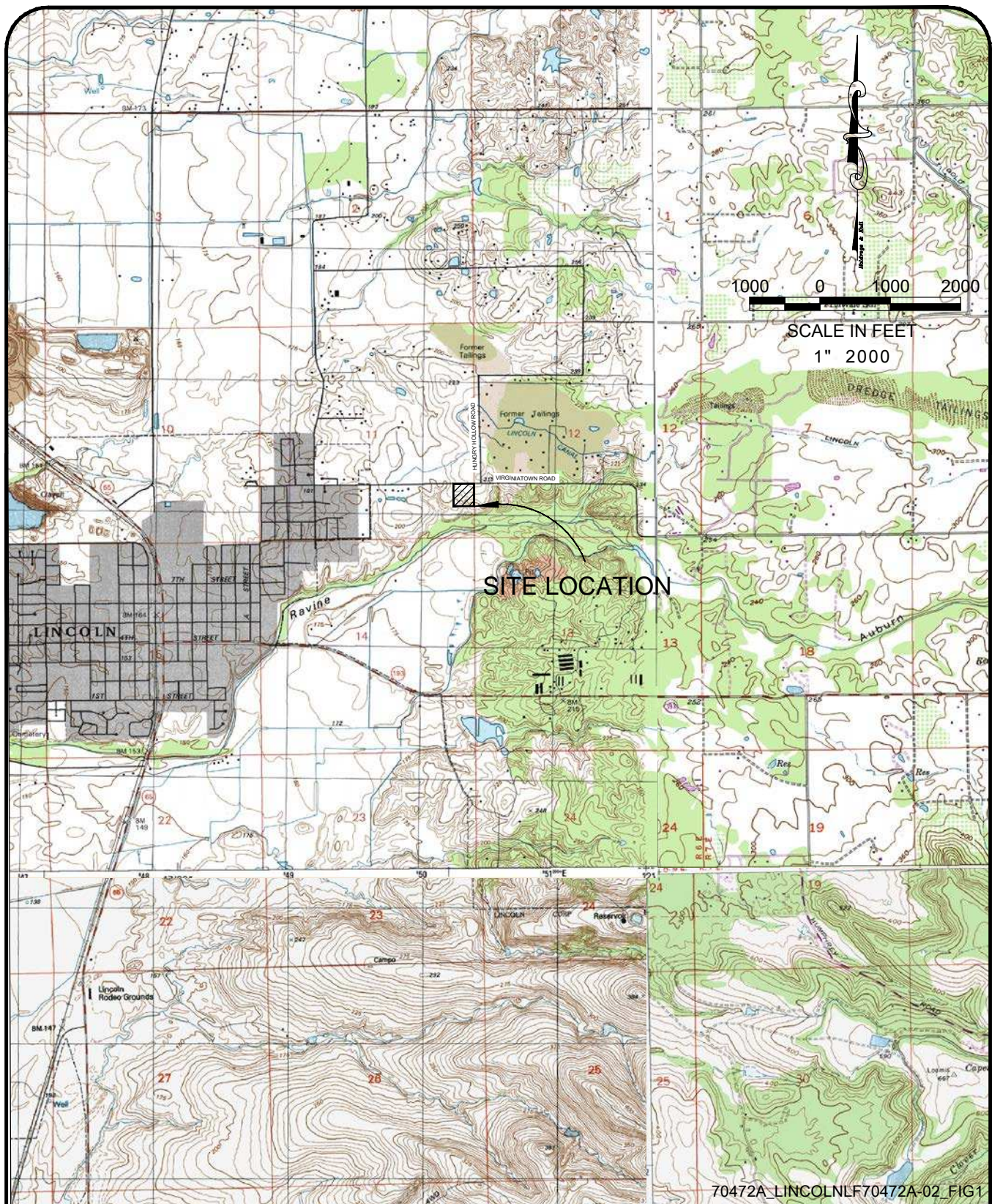
5. The project site map shows approximate subsurface exploratory locations as determined by pacing distances from identifiable site features; therefore, their locations should not be relied upon as being exact nor located with the accuracy of a California licensed land surveyor.
6. H&K's experience and that of the civil engineering profession clearly indicates that during the construction phase of a project the risks of costly design, construction and maintenance problems can be significantly reduced by retaining the design geotechnical engineering firm to review the project plans and specifications and to provide geotechnical engineering construction quality assurance (CQA) observation and testing services. Upon your request we will prepare a CQA geotechnical engineering services proposal that will present a work scope, tentative schedule and fee estimate for the City of Lincoln's consideration and authorization. If H&K is not retained to provide geotechnical engineering CQA services during the construction phase of the project, then H&K will not be responsible for geotechnical engineering CQA services provided by others nor any aspect of the project that fails to meet the City of Lincoln's or a third party's expectations in the future.

9 REFERENCES

- California Geological Survey, 2011. *Preliminary Geologic Map of the Sacramento 30' x 60' Quadrangle, California*. Compilation and digital Preparation by: Carlos I. Gutierrez.
- CardnoATC, 2013. *Annual Monitoring Report, 2013*. January 29.
- City of Lincoln, 2004. *Public Utilities Improvement Standards*.
- Fetter, C.W., 2001. *Applied Hydrogeology, Fourth Edition*.
- Harr, M.E., 1962. *Groundwater and Seepage*. pp 43-44. ISBN 07-026740-5.
- Helley, Edward J., and Harwood, David S., 1985. *Geologic Map of Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1790*. 5 plates, scale 1:62,500, 1 pamphlet, 24 p., URL: <http://pubs.usgs.gov/mf/1985/1790/>.
- Holdrege & Kull, 2014. *Field Summary Report and Updated Conceptual Site Model, Closed Lincoln Landfill*. May 15.
- Regional Water Quality Control Board, 2003. *Order No. R5-2003-0142, Waste Discharge Requirements for City of Lincoln, Lincoln Landfill Class III Landfill Post-Closure Maintenance and Corrective Action, Placer County*.
- RWQCB, 2014. *Regional Water Quality Control Board, Central Valley Region, Cleanup an Abatement Order R5-2014-0703 for City of Lincoln, Lincoln Landfill, Placer County*. June 3.
- State Water Resources Control Board, 2012. *National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges of Storm Water Associated with Construction Activity Construction General Permit Order 2012-00006-DQWQ*. July 17.

FIGURES

- 1 Site Location***
- 2 Site Layout***
- 3 Proposed Monitoring Well Location***



8 SEVILLE CT, SUITE 100
CHICO, CA 95928

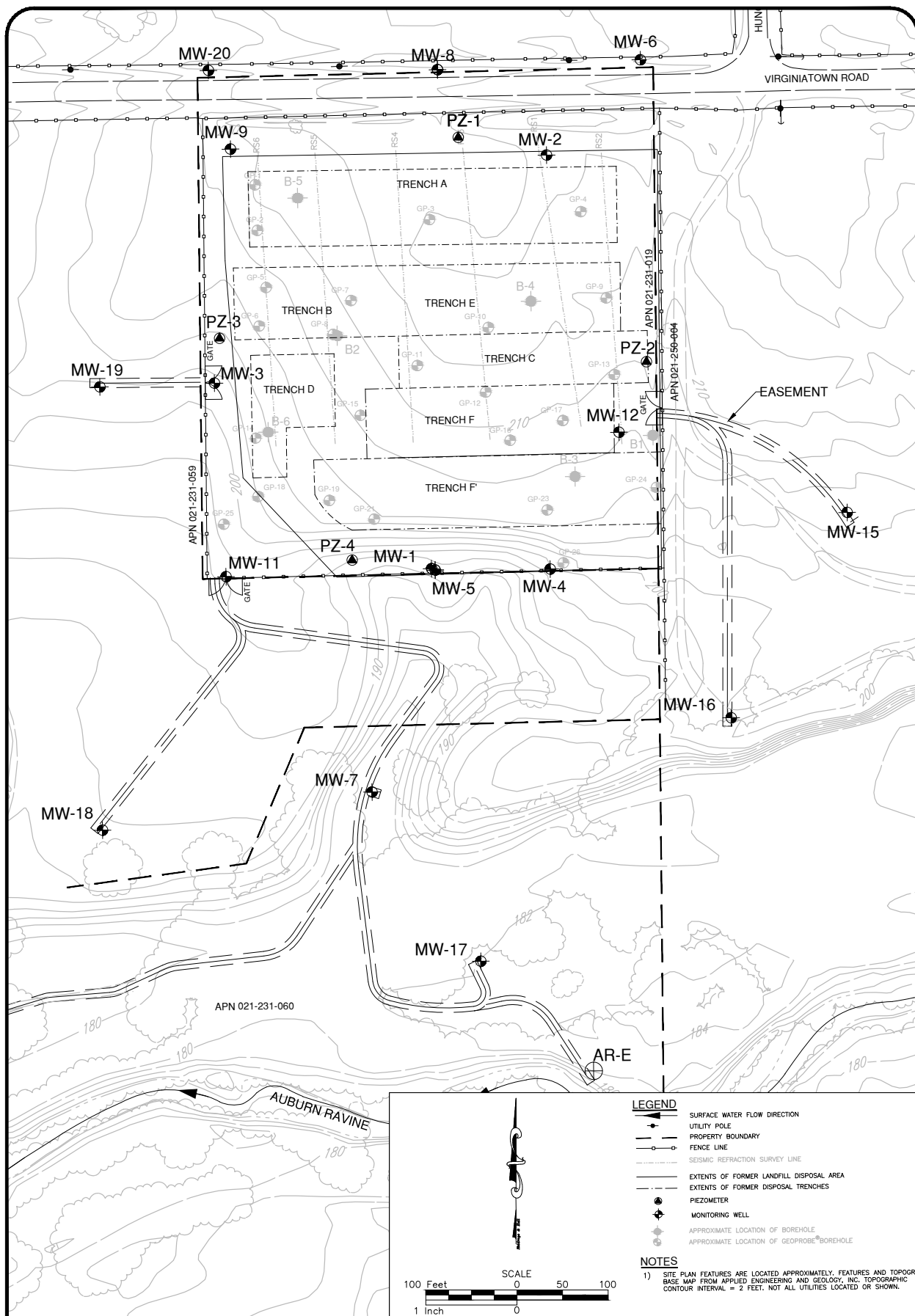
530 894-2487 FA 894-2437

SITE LOCATION MAP
CLOSED LINCOLN LANDFILL
LINCOLN, PLACER COUNTY, CALIFORNIA

PROJ NO.: 70472A-02

DATE: SEPT, 2014

FIGURE NO.: 1



HK HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS

8 Seville Court, Suite 100
Chico, CA 95928
PH: 530-894-2487 FAX: 530-894-2437

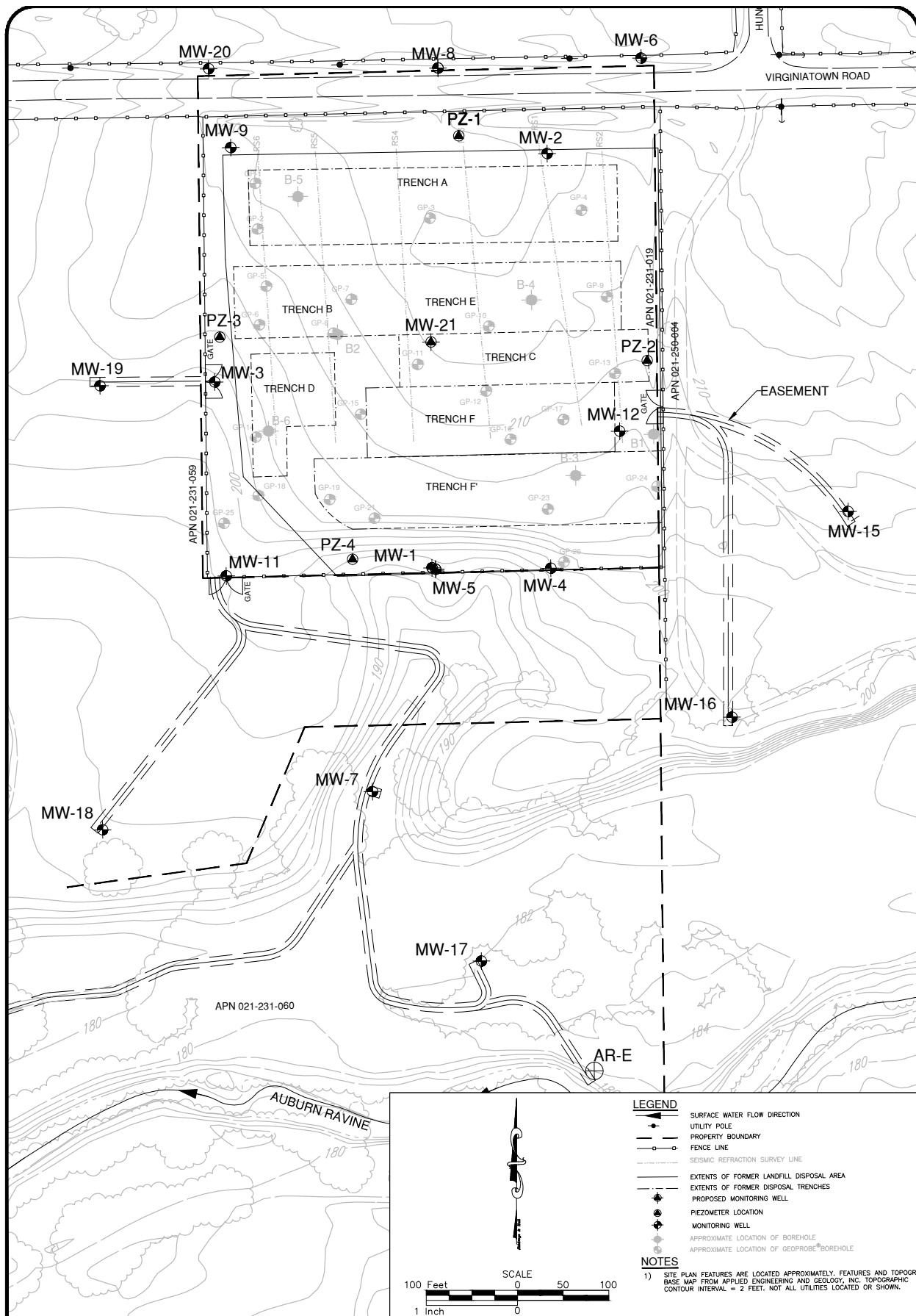
SITE PLAN
CLOSED LINCOLN LANDFILL
LINCOLN, CALIFORNIA

DRAWN BY: HJC
CHECKED BY: DMO
PROJECT NO.: 70472A-02
DATE: SEPT, 2014

FIGURE NO.

2

249



HK HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS
8 Seville Court, Suite 100
Chico, CA 95928
PH: 530-894-2487 FAX: 530-894-2437

**PROPOSED MONITORING WELL
LOCATION
CLOSED LINCOLN LANDFILL
LINCOLN, CALIFORNIA**

DRAWN BY: HJC
CHECKED BY: DMO
PROJECT NO.: 70472A-01
DATE: SEPTEMBER, 2014

FIGURE NO.

3

250

APPENDIX A

Regulatory Correspondence

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

CLEANUP AND ABATEMENT ORDER R5-2014-0703
FOR

CITY OF LINCOLN
LINCOLN LANDFILL, PLACER COUNTY

This Order is issued to City of Lincoln (hereafter Discharger) based on provisions of California Water Code section 13304, which authorizes the California Regional Water Quality Control Board, Central Valley Region, (hereafter Central Valley Water Board or Board) to issue a Cleanup and Abatement Order (CAO), and Water Code section 13267, which authorizes the Board to require the submittal of technical reports.

The Assistant Executive Officer of the Central Valley Water Board finds, with respect to the Discharger's acts, or failure to act, the following:

1. The Discharger owns and operates the Lincoln Landfill, an unlined Class III landfill located east of the City of Lincoln. The site covers approximately 6-acres. Waste was placed in unlined trenches and the refuse was burned to reduce volume. Waste was last placed in the landfill in 1976 and the landfill was closed in 1993 with a low hydraulic conductivity clay cover.
2. Waste Discharge Requirements (WDRs) Order R5-2003-0142 was adopted on 5 September 2003. The WDRs regulate post-closure maintenance and require the Discharger to conduct investigation to define the extent of groundwater contamination and to implement corrective action at the site. The WDRs also require the Discharger to maintain five feet of separation between the bottom of waste and groundwater.
3. The Discharger must comply with the requirements of the WDRs and with Title 27 of the California Code of Regulations (Title 27).
4. Finding 22 in the WDRs state that groundwater beneath the landfill ranges between 13 and 22 feet below ground surface (bgs) and can fluctuate seasonally up to four feet bgs. At the time the WDRs were adopted, data indicated that there may be less than the required minimum of five feet of separation between groundwater and landfill wastes, and therefore the WDRs required the Discharger to monitor groundwater and to implement corrective action measures as necessary to maintain the required separation.
5. Volatile organic compounds (VOCs) were first detected in the groundwater in 1989. In addition, elevated levels of inorganic compounds have been found in the groundwater and the concentrations did not decline with the installation of the landfill cover in 1993. The WDRs state that the full extent of the inorganic constituent plume has not been defined.
6. In February 2000, Board staff requested the submittal of a Corrective Action Plan (CAP) and Engineering Feasibility Study (EFS) to address groundwater impacts at the site. The Discharger had difficulties in obtaining access rights to land downgradient of the landfill,

and at the time that the WDRs were adopted in 2003, had not yet submitted the documents. The WDRs required that offsite wells be installed by May 2004, that the CAP and EFS be submitted by July 2004, and that corrective actions be implemented by July 2005.

Impacts to Groundwater Quality

7. Although the WDRs required that the Discharger install additional groundwater monitoring wells by 2004, the wells were not installed until much later. In 2010, the Discharger installed three wells and in 2011, the Discharger installed three more wells. With these installations, the site appears to have an appropriate number of wells to evaluate offsite contamination and to define the extent of the plume.
8. The Lincoln Landfill groundwater monitoring program currently consists of 17 groundwater monitoring wells. Eight wells are located within the six-acre site boundary, and nine wells are located off-site.
9. The WDR Monitoring and Reporting Program (MRP) requires the Discharger to conduct groundwater monitoring, and to determine "concentration limits" for each constituent of concern using statistical methods. Monitoring Specification E.3 states, in part: "*The concentrations of constituents of concern in waters passing the Point of Compliance shall not exceed the concentration limits...*" The Point of Compliance is defined (C.4 of the MRP) as a vertical surface at the downgradient edge of the unit, as measured at wells MWs-1, 3, 4, and 5. Any exceedence of the concentration limit downgradient of these four wells is considered a violation of the WDRs and of Title 27.
10. Analytical results from groundwater samples collected from monitoring wells during the monitoring event in the first half 2013 indicates that two wells exceeded the concentration limit (CL) for specific conductance; seven wells exceed the CL for bicarbonate; two wells exceeded the CL for chloride; four wells exceeded the CL for nitrogen; and eight wells exceeded the CL for sulfate, as summarized below. Exceedences of bicarbonate could be an indication of landfill gas generation and the exceedence of chloride could be an indication of the formation of leachate. Exceedences of nitrogen and sulfate concentration limits could be due to biodegradation of organic material within the waste mass.

Summary of Inorganic Analytical Results vs. Concentration Limits (CL)

	Specific Conductance	Bicarbonate	Chloride	Nitrogen	Sulfate
CL	2,745	360	200	5.3	40
Well ID					
MW-2 (upgradient)	513	210	16	2.5	29
MW-1	2,776	530	200	18	800
MW-3	2,211	560	67	1.6	700
MW-4	3,387	460	210	13	1,200
MW-5	2,677	600	110	13	740
MW-7	1,282	310	110	4.2	460
MW-11	1,770	380	140	1.2	440
MW-12	2,270	450	120	8.9	700
MW-16	610	220	24	1.0	58
MW-18	1,186	580	14	<0.50	15

11. In general, the wells with exceedences are located within the landfill or at the compliance boundary of the unit. Two downgradient offsite wells, MW-7 and MW-16, exceeded the CL for sulfate. Downgradient offsite well MW-18 reported an exceedance of the CL for bicarbonate. The exceedence of the concentration limit in these downgradient wells is a violation of the WDRs.
12. Volatile organic compounds (VOCs) were not detected during the monitoring event in the first half 2013 although VOCs have been reported in various site wells in the past, including downgradient offsite well MW-18. According to the Annual 2013 monitoring report, VOCs were not detected in the site wells during the second half of 2013 except for well MW-11, which contained a trace concentration of cis-1,2-dichloroethene at 0.33 micrograms per liter (µg/L). A detection of a VOC is a violation of the WDRs (see C.2.b of the MRP).
13. Based on the isoconcentration maps presented in the Annual 2013 monitoring report, it is evident that a release from the landfill has affected groundwater quality both beneath the landfill and south of the landfill.

Separation of Waste from Groundwater

14. Discharge Specification B.1 states “A minimum separation of five feet shall be maintained between wastes or leachate and the highest anticipated elevation of underlying groundwater per Section 20240(c) of Title 27.”

15. Provision G.11 of the WDRs requires the Discharger to develop and implement a Corrective Action Plan and Engineering Feasibility Study that was to include, among other items corrective action measures to maintain “*adequate separation from groundwater.*” The deadline for submission of this document was 15 July 2004 and the deadline for implementation of corrective action was 15 July 2005. The Discharger has not complied with either requirement.
16. Provision E.1.4 of the MRP requires that the Discharger monitoring groundwater, and among other items, determine “*separation of groundwater from the lowest point of the unit.*” The Discharger’s 2013 Annual Monitoring Report states “*Based on current data, the separation between the bottom of the waste trenches and the highest expected groundwater level is unknown.*” The Discharger is in violation of the WDRs for failing to measure and report the separation between the waste and high groundwater.
17. Finding 23 of the WDRs states that historical information and groundwater elevation data indicates that there is less than five feet of separation between groundwater and landfill wastes. In addition, during a 27 August 2013 meeting, the Discharger presented information indicating that groundwater separation was not being achieved as required, even in dry years.
18. Board Staff reviewed current groundwater data submitted in the *Conceptual Site Model and Data Gaps Work Plan* dated 31 January 2014. Figure 4 presents historical groundwater elevations measured in the monitoring wells across the site. Staff compared these elevations to the deepest elevation of waste recorded during a soils investigation conducted in 2004. The deepest elevation of waste recorded was 189.6 feet msl (mean sea level). Since five feet of separation between waste and groundwater is required by the WDRs, staff determined that an elevation of 184.6 msl is the compliance point that must be maintained for purposes of separation. If groundwater exceeds this elevation, then the Discharger is in violation of its WDRs because it is not maintaining a five foot separation.

According to Figure 4, multiple wells over time have recorded groundwater elevations that exceed the 184.6 msl elevation. In addition, staff plotted the compliance elevation of 184.6 msl on Figure 7 of the work plan and compared that elevation to the December 2013 groundwater elevations recorded. It is apparent that groundwater beneath approximately one-third of the landfill was measured at an elevation that exceeded the 184.6 msl elevation. In summary, staff’s review of the data submitted by the Discharger shows that the Discharger is consistently in violation of the five foot separation required by Discharge Specification B.1 of the WDRs.

19. Data indicates that the Discharger has been in violation of Discharge Specification B.1 for many years and that the Discharger should have implemented corrective actions to achieve the separation. This Order requires that the Discharger immediately comply with the WDR reporting requirements, including the requirement to report the separation to groundwater. This Order also reiterates the WDR requirement to submit a Corrective Action Plan to ensure that five feet of separation is maintained at all times.

Recent Events

20. In a letter dated 11 March 2013, staff issued a Notice of Violation (NOV) for non-compliance with the WDRs. The NOV was based on a review of the 2012 Annual Monitoring Report for the Lincoln Landfill, which found: two groundwater monitoring wells (MW-1 and MW-18) contained VOCs, deficient analytical reporting limits, and the non-submittal of a corrective action plan (CAP) and engineering feasibility study (EFS) which was required to be submitted by July 2004. The Discharger submitted a CAP and EFS on 9 May 2013. The Discharger proposed to repair the clay cover as the corrective measure to address groundwater
21. On 27 August 2013, staff met with the Discharger to discuss the CAP and EFS. The Discharger stated that the landfill cover had not been maintained in the past and, as a corrective action, proposed to fix the cover and monitor the groundwater. During the meeting, the Discharger also provided depth-to-groundwater information in relation to the bottom of waste, which further indicated that groundwater separation was not being achieved even in dry years. The data showed that in wet years, groundwater rises and saturates portions of the waste.
22. On 11 September 2013, staff conducted an inspection of the Lincoln Landfill to determine the condition of the final cover and whether or not the cover could allow storm water to infiltrate the waste mass. Staff walked the site with the Discharger and determined that only minor post-closure maintenance was needed to the surface of the final cover.
23. In a letter dated 16 September 2013, Board staff rejected the Discharger's proposed corrective action measure of maintaining the cover. Staff's letter states: *"The closure cover is the final containment structure for the landfill and the Board requires the Discharger to maintain the cover in accordance with the Final Closure Plan and Closure Specifications C.1 through C.11 of the WDRs. The closure cover was not constructed as a corrective measure, and post-closure maintenance of the closure cover is a requirement of the WDRs, Standard Provisions and Reporting Requirements, and Title 27. The Discharger's recommendation to only repair the closure cover as a corrective action measure is not appropriate at this time. However, the Discharger must repair and maintain the cover as part of its required post closure maintenance activities."*

In addition, the letter required that the Discharger submit a work plan by 30 October 2013 to comply with the WDR requirement for (a) maintaining five feet of separation from groundwater and (b) implementing corrective action with regard to the groundwater plume. Based on the discussion during the August meeting, staff expected the Discharger to submit a proposal to extract groundwater to obtain the five foot separation and to contain the plume.

24. The Discharger requested an extension to submit the work plan, citing the need to change consultants and discuss the matter with the City Council. Board staff granted the City's

request to submit the work plan on 1 February 2014, but also requested that monthly updates be provided.

25. The Discharger's first monthly update on 15 December 2013 states that there is not enough data to design a groundwater extraction system and therefore the Discharger proposed field work that would continue through the summer of 2014. However, the Discharger stated it would submit a 50% design of the extraction system on 1 February 2014.
26. The Discharger's second monthly update on 15 January 2014 reiterates the need to obtain more data and requested a meeting with Board staff.
27. Staff met with the Discharger on 29 January 2014 to discuss the Discharger's recommendations regarding further investigation into the subsurface conditions under the landfill. The Discharger determined it was appropriate to better define groundwater conditions prior to identifying the appropriate corrective action, and proposed installing four nested piezometers to define the underlying groundwater system as confined, unconfined, or perched. According to the Discharger, the City Council approved the budget to install the piezometers and to write a report. However, no other funding beyond piezometer installation has been approved by the City Council. The Discharger proposed deadlines of 1 February 2014 and 30 April 2014 to submit a work plan and piezometer installation report, respectively. The Discharger submitted the work plan on 7 February 2014 and Central Valley Water Board staff approved it in an email on 20 February 2014.
28. The Discharger submitted a third monthly update dated 13 February 2014. This update recapped the 29 January 2014 meeting and provided a tentative schedule to install the four nested piezometers. Staff approved the work plan in an email dated 20 February 2014. The Discharger has provided verbal notification that the piezometers were installed but has not submitted an installation report to staff. The Discharger has not submitted the 50% design of the extraction system.
29. The Discharger submitted a *Field Summary Report and Updated Conceptual Site Model* dated 15 May 2014. This report was prepared following the installation of four piezometers (PZ-1 through PZ-4) and a hydrogeologic investigation to determine the physical characteristics of the underlying aquifer. The report states that the 4 March 2014 groundwater measurements show that, in a few locations, (a) groundwater is within five feet of the waste and (b) groundwater intersects the bottom of the waste trenches and may come into contact with waste materials. The Discharger utilized the findings to define a course of corrective action to achieve compliance with the WDRs. The Discharger's proposal to install a cutoff trench dewatering system has been incorporated into this Order.
30. The Discharger provided comments on a draft of this Order. The comments have been incorporated and the deadline to install the cutoff trench dewatering system has been modified based on the Discharger's request for additional time. In its comments, the Discharger states that it "does not have a particular funding source earmarked for remediation project. Consequently the City will likely need to use money from its General Fund, as available, for completing corrective actions." To ensure that the Discharger

secures the appropriate funding to implement remediation, whether from the General Fund or an alternate source, a requirement to submit quarterly progress reports describing the steps taken to obtain funding for the tasks has been added herein. Asserting inadequate funding to implement the tasks of this Order as justification for noncompliance with task deadlines will not preclude the Discharger from further enforcement actions for failure to comply with the deadlines of this Order.

BASIS FOR CLEANUP AND ABATEMENT ORDER

31. The Discharger is required by WDRs R5-2003-0142 to develop and implement a Corrective Action Plan and Engineering Feasibility Study for (a) groundwater corrective action and monitoring and (b) maintenance of the five feet of separation between waste and groundwater. For a period of almost ten years, the Discharger was unable to conduct the appropriate offsite investigation due to private property access issues, resulting in non-compliance with the WDRs. Access to define offsite contamination was recently attained and additional groundwater wells were installed. Based on groundwater sampling data collected from these wells and wells onsite, the Discharger prepared the required CAP and EFS but was submitted on 9 May 2013, nine years after the date in the WDRs. However, the CAP and EFS was inadequate and does not address the two main violations of the WDRs (i.e., lack of five foot separation and groundwater impacts).
32. The WDRs required the Discharger to install corrective actions by July 2005. That work has not been completed, and as of this date, it is unclear whether the Discharger has a plan or financing approval to complete the work.
33. This Order provides a timeframe for the Discharger to perform additional site investigations and to propose and install appropriate corrective actions, as previously required in the WDRs, to (a) maintain a minimum of five feet separation between the waste and groundwater, and (b) remediate the groundwater impacts. This Order also requires the Discharger to maintain its landfill cover consistent with the WDRs, conduct quarterly inspections of the cover, and to certify the groundwater monitoring system meets the standards of Title 27 for a Detection Monitoring System.

REGULATORY CONSIDERATIONS

34. The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition* (hereafter Basin Plan) designates beneficial uses, establishes water quality objectives, contains implementation plans and policies for protecting waters of the basin, and incorporates by reference plans and policies adopted by the State Board. These requirements implement the Basin Plan.
35. Surface water drainage is to the south into Auburn Ravine, which is a tributary to the Sacramento River, which flows into the Sacramento-San Joaquin Delta. The beneficial uses of the Sacramento River, as specified in the Basin Plan, are municipal and domestic

supply, agricultural irrigation supply; stock watering, hydroelectric power generation, recreation; freshwater habitat, fish migration and spawning; wildlife habitats; groundwater recharge; fresh water replenishment; preservation of rare and endangered species; and aesthetic enjoyment.

36. The beneficial uses of the underlying groundwater are municipal and domestic supply, agricultural supply, and industrial service supply.
37. Title 27, section 20365 subdivision (a) states in part: *Units and their respective containment structures shall be designed and constructed to limit, to the greatest extent possible, ponding, infiltration, inundation, erosion, slope failure, washout, and overtopping under the precipitation conditions specified in Table 4.1...* Section 20365 subdivision (c) contains specific performance standards for the design, construction, and maintenance of diversion and drainage facilities. Section 20365 subdivision (f) requires that landfill covers be graded to divert precipitation, prevent ponding, and resist erosion.
38. Title 27, section 20240 subdivision (c) states in part: *"...Existing landfills, waste piles, and surface impoundments shall be operated to ensure that wastes will be a minimum of five feet (5 ft.) above the highest anticipated elevation of underlying ground water."*
39. Water Code section 13304 subdivision (a) states, in relevant part: *Any person who has discharged or discharges waste into the waters of this state in violation of any waste discharge requirement or other order or prohibition issued by a regional board or the state board, or who has caused or permitted, causes or permits, or threatens to cause or permit any waste to be discharged or deposited where it is, or probably will be, discharged into the waters of the state and creates, or threatens to create, a condition of pollution or nuisance, shall upon order of the regional board, clean up the waste or abate the effects of the waste, or, in the case of threatened pollution or nuisance, take other necessary remedial action, including, but not limited to, overseeing cleanup and abatement efforts.*
40. Water Code section 13267 subdivision (b) states, in relevant part: *In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region ... shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.*
41. The technical reports required by Water Code section 13267 and this CAO are necessary to evaluate compliance with this CAO and WDRs Order R5-2003-0142, and to ensure the protection of water quality. The Discharger owns and operates the facility that discharges waste subject to this CAO and WDRs Order R5-2003-0142.

42. Issuance of this Order is being taken for the protection of the environment and as such is exempt from provisions of the California Environmental Quality Act (CEQA) (Public Resources Code section 21000 et seq.) in accordance with California Code of Regulations, title 14, sections 15061 subdivision (b)(3), 15306, 15307, 15308, and 15321. This Order generally requires the Dischargers to submit plans for approval prior to implementation of cleanup activities at the landfill. Mere submittal of plans is exempt from CEQA as submittal will not cause a direct or indirect physical change in the environment and/or is an activity that cannot possibly have a significant effect on the environment. CEQA review at this time would be premature, however, if the Central Valley Water Board determines that implementation of any plan required by this Order will have a significant effect on the environment, the Discharger will conduct the necessary and appropriate environmental review prior to the Assistant Executive Officer's approval of the applicable plan. The Discharger will bear the costs of determining whether implementation of any plan required by this Order will have a significant effect on the environment and, if so, in preparing and handing any documents necessary for environmental review.

IT IS HEREBY ORDERED that, pursuant to Water Code sections 13304 and 13267, the City of Lincoln shall cleanup and abate the Lincoln Landfill in accordance with the scope and schedule set forth below, in order to comply with WDRs Order R5-2003-0142 and the State Water Board General Storm Water Permit.

1. The Discharger shall **immediately** comply with all aspects of Monitoring and Reporting Program (MRP) R5-2003-0412, including item E.1.4 which requires that the Discharger report the "*separation of groundwater from the lowest point of the unit*". Based on the data presented in the Discharger's 31 January 2014 piezometer work plan, the lowest elevation of the landfill is located in Trench F at an elevation of 189.6 feet msl, and therefore groundwater is not to exceed 184.6 feet msl, under the entire footprint of the landfill.
2. **Beginning with the second quarter of 2014**, the Discharger shall conduct routine post-closure inspections and maintenance of the landfill cover and monitoring devices associated with the Detection Monitoring Program (DMP). The Discharger is required to comply with the Closure Specifications of the WDRs including "Closure and Post-Closure Specifications" in Section IX of the Standard Provisions and Reporting Requirements, as well as section 20365 of Title 27. The Discharger shall conduct post-closure inspections **semi-annually** and report the findings in the semi-annual groundwater monitoring reports submitted in accordance with MRP R5-2003-0142.
3. **Beginning with the second quarter of 2014**, the Discharger shall submit *Quarterly Progress Reports* describing (a) the source of funding that has been obtained to implement the requirements described in this Order and (b) the progress toward complying with the requirements of this Order. The reports are due on the first day after the end of each quarter (i.e., by **1 April, 1 July, 1 October, and 1 January**). The first report is due by **1 July 2014**.

4. By **30 September 2014** the Discharger shall submit a *Corrective Action Workplan* describing actions that will be taken to (a) maintain five feet of separation beneath the lowest elevation of the waste, and (b) provide source control and groundwater remediation. Actions already required by the WDRs such as maintenance of the landfill cover are not considered "corrective actions." Due to the number of years of groundwater contamination at this site, natural attenuation within the compliance boundary of the landfill is not an acceptable corrective action. At a minimum, the Discharger shall consider a cutoff trench dewatering system to lower the groundwater beneath the site, control the source of pollutants, and capture a portion of the downgradient plume.

The *Workplan* shall include an updated Site Conceptual Model based on the field work conducted in 2014. If the Discharger believes that the current groundwater monitoring network is not adequate to determine whether there is five feet of separation between waste and groundwater, then the *Workplan* shall include a proposal to install monitoring wells in the areas of the deepest waste mass. These wells shall be screened for five feet below the bottom of the waste. If the Discharger wishes to install these wells, then the *Workplan* shall include the information found in Attachment A to this Order.

5. By **1 October 2015** the Discharger shall submit a *Corrective Action Installation Report* that documents that the *Corrective Action Workplan* was implemented as approved by Board staff.
6. In addition to the above, the Discharger shall comply with WDRs Order R5-2003-0142 and all applicable provisions of Title 27 and the Water Code that are not specifically referred to in this Order.

As required by the California Business and Professions Code sections 6735, 7835, and 7835.1, all reports shall be prepared by, or under the supervision of, a California Registered Engineer or Professional Geologist and signed by the registered professional.

Any person signing a document submitted under this Order shall make the following certification:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my knowledge and on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

If the Discharger is unable to perform any activity or submit any document in compliance with the schedule set forth herein, or in compliance with any work schedule submitted pursuant to this Order and approved by the Assistant Executive Officer, the Discharger may request, in writing, an extension of the time specified. The extension request shall include justification for the delay. Any extension request shall be submitted as soon as a delay is recognized and prior

to the compliance date. An extension may be granted by revision of this Order or by a letter from the Assistant Executive Officer.

If the Discharger fails to comply with the provisions of this Order, the Assistant Executive Officer may refer this matter to the Attorney General for judicial enforcement or may issue a complaint for administrative civil liability. Failure to comply with this Order may result in the assessment of administrative civil liability up to \$10,000 per violation per day, pursuant to the Water Code sections 13268, 13350, and/or 13385. The Central Valley Water Board reserves its right to take any enforcement actions authorized by law.

Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at: http://www.waterboards.ca.gov/public_notices/petitions/water_quality or will be provided upon request.

This Order is effective upon the date of signature.

Original Signed By:

Andrew Altevogt, Assistant Executive Officer

3 June 2013

(Date)

TAD/HFH/WSW: 27May14

Attachments:

- A: Monitoring Well Installation Workplan Guidelines
- B: Monitoring Wells Installation Report Guidelines

ATTACHMENT A
Monitoring Well Workplans and Groundwater Sampling and Analysis Plan

The monitoring well installation work plan shall contain the following minimum information:

A. General Information:

- Purpose of the well installation project
- Brief description of local geologic and hydrogeologic conditions
- Proposed monitoring well locations and rationale for well locations
- Topographic map showing facility location, roads, and surface water bodies
- Large scaled site map showing all existing on-site wells, proposed wells, surface drainage courses, surface water bodies, buildings, waste handling facilities, utilities, and major physical and man-made features

B. Drilling Details:

- On-site supervision of drilling and well installation activities
- Description of drilling equipment and techniques
- Equipment decontamination procedures
- Soil sampling intervals (if appropriate) and logging methods

C. Monitoring Well Design (in narrative and/or graphic form):

- Diagram of proposed well construction details
 - Borehole diameter
 - Casing and screen material, diameter, and centralizer spacing (if needed)
 - Type of well caps (bottom cap either screw on or secured with stainless steel screws)
 - Anticipated depth of well, length of well casing, and length and position of perforated interval
 - Thickness, position and composition of surface seal, sanitary seal, and sand pack
 - Anticipated screen slot size and filter pack

D. Well Development (not to be performed until at least 48 hours after sanitary seal placement):

- Method of development to be used (i.e., surge, bail, pump, etc.)
- Parameters to be monitored during development and record keeping technique
- Method of determining when development is complete
- Disposal of development water

E. Well Survey (precision of vertical survey data shall be at least 0.01 foot):

- Identify the Licensed Land Surveyor or Civil Engineer that will perform the survey
- Datum for survey measurements
- List well features to be surveyed (i.e. top of casing, horizontal and vertical coordinates, etc.)

F. Schedule for Completion of Work

G. Appendix: Groundwater Sampling and Analysis Plan (SAP)

The Groundwater SAP shall be included as an appendix to the work plan, and shall be utilized as a guidance document that is referred to by individuals responsible for conducting groundwater monitoring and sampling activities.

Provide a detailed written description of standard operating procedures for the following:

- Equipment to be used during sampling
- Equipment decontamination procedures
- Water level measurement procedures
- Well purging (include a discussion of procedures to follow if three casing volumes cannot be purged)
- Monitoring and record keeping during water level measurement and well purging (include copies of record keeping logs to be used)
- Purge water disposal
- Analytical methods and required reporting limits
- Sample containers and preservatives
- Sampling
 - General sampling techniques
 - Record keeping during sampling (include copies of record keeping logs to be used)
 - QA/QC samples
- Chain of Custody
- Sample handling and transport

Attachment B - Monitoring Well Installation Report

The monitoring well installation report must provide the information listed below. In addition, the report must also clearly identify, describe, and justify any deviations from the approved work plan.

A. General Information:

Purpose of the well installation project

Brief description of local geologic and hydrogeologic conditions encountered during installation of the wells

Number of monitoring wells installed and copies of County Well Construction Permits

Topographic map showing facility location, roads, surface water bodies

Scaled site map showing all previously existing wells, newly installed wells, surface water bodies, buildings, waste handling facilities, utilities, and other major physical and man-made features.

B. Drilling Details (in narrative and/or graphic form):

On-site supervision of drilling and well installation activities

Drilling contractor and driller's name

Description of drilling equipment and techniques

Equipment decontamination procedures

Soil sampling intervals and logging methods

Well boring log

- Well boring number and date drilled
- Borehole diameter and total depth
- Total depth of open hole (same as total depth drilled if no caving or back-grouting occurs)
- Depth to first encountered groundwater and stabilized groundwater depth
- Detailed description of soils encountered, using the Unified Soil Classification System

C. Well Construction Details (in narrative and/or graphic form):

Well construction diagram, including:

- Monitoring well number and date constructed
- Casing and screen material, diameter, and centralizer spacing (if needed)
- Length of well casing, and length and position of perforated interval
- Thickness, position and composition of surface seal, sanitary seal, and sand pack
- Type of well caps (bottom cap either screw on or secured with stainless steel screws)

E. Well Development:

Date(s) and method of development

How well development completion was determined

Volume of water purged from well and method of development water disposal

Field notes from well development should be included in report

- F. Well Survey (survey the top rim of the well casing with the cap removed):
- Identify the coordinate system and datum for survey measurements
 - Describe the measuring points (i.e. ground surface, top of casing, etc.)
 - Present the well survey report data in a table
 - Include the Registered Engineer or Licensed Surveyor's report and field notes in appendix

APPENDIX B

Conceptual Site Model

B1 CONCEPTUAL SITE MODEL

This Appendix presents the hydrogeologic setting and contamination distribution for the Closed Lincoln Landfill originally presented in the *Field Summary Report and Updated Conceptual Site Model, Closed Lincoln Landfill* (Holdrege & Kull, May 15, 2014). The conceptual site model (CSM) is intended to summarize the currently available information on the geologic features, contaminant releases, migration pathways, potential receptors, and other information critical to understanding the hydrogeology and contamination and for focusing decision making. A CSM is a fundamentally iterative process (rather than a static depiction) that is necessary for developing dynamic work plan strategies that move efficiently toward appropriate corrective action decisions and the effective restoration of sites.

B1.1 PHYSIOGRAPHY AND CLIMATE

The site, located approximately 0.4 miles east of the City of Lincoln on the south side of Virginiatown Road, is in the low rolling Sierra Nevada foothill terrain at an average elevation of approximately 205 feet above mean sea level (msl). The site is generally at a higher elevation than the surrounding properties to the west, east and south. There is a gentle topographic ridge located east of the centerline of the property, and the apex of the ridge strikes approximately north-south. The majority of the site gently slopes to the south and southwest with approximately 8 feet of relief to within approximately 65 feet of the southern property boundary. From that point there is a relatively sharp break in slope with approximately 10 feet of relief sloping downwards to the southern property line. Physiography of the surrounding area and site is depicted on Figures B1 and B2.

The climate within the study area is characterized by hot, dry summers and cool, moist winters. Summer temperatures range from 80 to 95 degrees Fahrenheit (°F), and winter temperatures range from 47°F to 54°F. Most of the precipitation occurs between October and April. Average annual precipitation is approximately 25 inches. Evaporation rates in the vicinity of the study area typically exceed 67 inches. Evaporation rates are highest during the hot, dry summer months and lowest during the cool, moist winter months.

The area surrounding the site is comprised of open land adjacent to the site on each side and residential housing beyond the open land to the west, northwest, and northeast of the site. Auburn Ravine is approximately 600 feet to the south and flows generally east to west. An unnamed intermittent drainage and surface water body lies approximately 350 feet to the west. Flow in the unnamed drainage appears to be from the Lincoln Canal (north and east of the site) and from residential properties to

the west (*Report of the Corrective Action Plan (CAP) and Engineering Feasibility Study* by Applied Engineering & Geology [AEG], May 3, 2013). On the south side of Auburn Ravine is the Turkey Creek Golf Course and agricultural property.

Runoff from the site drains primarily as sheet flow toward the low-relief surface water ditches on the west and east property boundaries and to the south property boundary, where it flows offsite and ultimately to Auburn Ravine. The site receives no run on, because there is a cutoff ditch and soil berm along the north property boundary, and the surrounding properties are at lower elevations.

The only infrastructure at the site are four dual nest piezometers (PZ-1 through PZ-4) and seventeen groundwater monitoring wells. Monitoring wells MW-2, MW-6, MW-8, and MW-20 are considered to be up gradient background wells relative to the location of the landfill. The remaining monitoring wells are considered to be located in down gradient areas or down/cross gradient areas relative to the landfill.

B1.2 SITE GEOLOGY

The *Preliminary Geologic Map of the Sacramento 30' x 60' Quadrangle, California* (California Geological Survey, 2011) depicts the geology underlying the Closed Lincoln Landfill as Pleistocene age (0.01 to 2.6 million years before present) arkosic alluvial deposits of the Riverbank Formation. The Riverbank Formation in the vicinity of the site is composed of weathered reddish gravel, sand and silt. It is derived from plutonic rocks that lie to the east in the Sierra Nevada Range (Helley, Edward J., and Harwood, David S., 1985. *Geologic Map of Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1790*).

Lithologic information and laboratory test results for samples obtained from the borings drilled for piezometers PZ-1 through PZ-4 indicates that the site is underlain by silty sand (SM). Particle size percentages estimated in the field consist of 60 percent subangular, fine to medium grained sand and 40 percent low plasticity silt size particles. This soil is predominantly reddish yellow with a Munsell Color Chart designation of 7.5YR 7/8. This soil was dense to very dense and dry to moist at the time of the investigation (February 2014). This soil is considered to have low permeability (1×10^{-4} to 1×10^{-5} centimeters per second [C.W. Fetter, 2001. *Applied Hydrogeology*, Fourth Edition) as evidenced by the relatively slow infiltration of groundwater to the borings during drilling. No weathered, highly fractured granitic rock was encountered in the borings to the total depths explored.

Notably different lithology was reported on the geologic log for well MW-17. The deposits consisted of clayey sand, poorly graded sand, and well graded sand indicative of recent alluvium laid down in the Auburn Ravine.

Review of the historical geologic logs for the site monitoring wells indicates that site geology consists of silt and clay with areas of sandy, silty gravel underlain by weathered, highly fractured granitic rock. The granitic bedrock encountered at the site was identified in previous investigations as “highly decomposed” diorite of the Mesozoic age (66 to 252 mybp) Penryn Pluton (Verification Monitoring Study Lincoln Inactive Landfill [Earthtec, Ltd., September 4, 1990]). The contact between the upper clay, silt, and gravel deposits and the underlying weathered bedrock was up to approximately 6 feet bgs. In a few of the logs (e.g., MW-1) the weathered granitic rock was exposed at the surface. The degree of weathering of the granitic rock ranged from severely to completely weathered in the shallower depths to less weathered with increasing depth. The presence of the granitic rock was not confirmed during the February 2014 drilling event.

B1.3 SITE HYDROGEOLOGY

Groundwater is present beneath the site in the unconsolidated, low permeability sediments of the Riverbank Formation (except well MW-17 where groundwater was encountered in the recent alluvial deposits of Auburn Ravine). Historical depths to the water table range from approximately 1 to 32 feet below the top of well casings. Seasonal fluctuation of the water table surface elevation in 16 of the site wells ranges from 2.54 feet to 15.38 feet. The water table elevation measured in MW-17 seasonally fluctuates up to 2.21 feet. Groundwater elevations in wells MW-1, MW-2, MW-3, MW 7, MW-11 and MW-18 appear to periodically rise above their screened intervals. The flow direction between well MW-7 and MW-17 periodically reverses to the north-northwest. This suggests that the creek may be a source of recharge to groundwater table during times of high surface water flows which causes the groundwater table flow direction reversal. Groundwater elevations measured starting on January 1, 1991 through March 11, 2014 are summarized in Table B1. A hydrograph of the groundwater elevations is presented in Figure B3.

The groundwater elevations measured on March 4, 2014 in shallow piezometers PZ-1A, PZ-2A, and PZ-3A indicate that groundwater is present at depths within the required five foot separation interval below the landfill waste. No groundwater was present in shallow piezometer PZ-4A on March 4, 2014.

Historical groundwater gradients, calculated from site monitoring wells, ranges from 0.019 to 0.260 feet per foot (ft/ft) with a consistent overall south-southeast flow direction. However, there appears to be a groundwater ridge present on the west side of the site where groundwater flows southwesterly west of the property boundary and southeasterly east of the property boundary. The groundwater gradient and flow direction calculated from the new piezometers and on site groundwater monitoring wells during March 2014 are consistent with historical estimates. The March 4 and

11, 2014 average groundwater gradients were 0.026 ft/ft and flow was generally to the southeast. Potentiometric surface contour maps for the March 4 and March 11, 2014 monitoring events are presented in Figures B4 and B5, respectively.

The average seepage velocity of the groundwater flowing within the vicinity of the waste trenches was estimated (from slug test data and the 2011 gradient) to have a geometric mean of approximately 1.7 feet per year. The seepage velocity estimated from MW-17 well data was unusually high at 385 feet per year; however, this value is likely due to the different lithology at this location and is considered to be an isolated data point (AEG, 2013).

Four geologic cross sections were developed to illustrate the historical high groundwater elevations, approximate vertical and horizontal extents of the waste trenches, and site lithology. Figure B6 shows the locations of the four geologic cross sections. Geologic cross sections A to A' and B to B' are presented in Figure B7 and geologic cross sections C to C' and D to D' are presented in Figure B8. As shown on the cross sections, groundwater is present within 5 feet of the bottom of the waste trenches and in a few locations intersects the trenches and may come in contact with waste materials.

B1.4 NATURE AND EXTENT OF CONTAMINATION

The CSM for this study area addresses constituents of concern (COCs) and the sources of the constituents as defined by the data collected to date.

B1.4.1 Constituents of Concern in Soil

Previous investigation data indicate that the onsite soil and the soil down gradient of the site may be impacted with chloride. The elevated concentrations of sodium detected in soil samples from MW 7 are thought to be the result of deposition of sediments laden with fertilizer that was applied at upstream locations along Auburn Ravine (possibly from Turkey Creek Golf Course). Concentrations of iron are thought to be the result of the high percentage of iron minerals such as biotite in the native materials at the site.

B1.4.2 Constituents of Concern in Soil Gas

Nine different VOCs were detected in the soil gas samples collected from within the limits of the waste: Freon 12, chloromethane, PCE, benzene, toluene, vinyl chloride, methylene chloride, Freon 114, and 2-propanol. The concentration data are summarized in Table 5-11 of AEG, 2013 (Annex A). Benzene, PCE, toluene and chloromethane were detected in the soil vapor samples and were also detected in the groundwater samples collected from the soil borings.

Detected concentrations of methane were less than the lower explosive limit of 5 percent by volume in air.

B1.4.3 Constituents of Concern in Groundwater

The constituents of concern in groundwater are described in the following as general minerals, VOCs, and SVOCs:

B1.4.3.1 General Minerals

Groundwater monitoring data from 2006 through 2013 indicate that concentrations of calcium, magnesium, potassium, sodium, chloride, nitrate as nitrogen, sulfate, TDS, and total alkalinity in down gradient wells consistently exceed the calculated concentrations limits or tolerance limits. This phenomenon suggests that a release of these COCs has occurred from the landfill waste. A summary of the historical concentrations and tolerance limits is provided in Table B2. Figures B9 through B17 depict concentration variations in site wells for the COCs measured from October 2006 through July 2013. In general, concentrations are relatively stable over time. However, there are notable increasing trends evident in MW-12 beginning in 2008. A notable increase in the tolerance limit for TDS is reported beginning in August 2011. No explanation for the increase was found in the corresponding groundwater monitoring report. H&K believes that the historical data and the notable difference between the TDS concentrations measured in the down gradient versus the up gradient wells, suggests that the calculated tolerance limits for TDS from August 2011 to the first semester of 2013 may be erroneous. A similar change in the TL for chloride is reported beginning in March 2012.

A comparison with WQGs reveals that TDS exceeds the California Department of Health Services (CDHS) maximum contaminant level (MCL) of 500 milligrams per liter (mg/L) within the site boundary, at the southern property boundary, and down gradient of the site at well MW-7. Chloride exceeds the Agricultural WQG of 106 mg/L within the site boundary, at the southern property boundary, and down gradient of the site at well MW-7. The concentration of chloride at well MW-7 periodically exceeds the MCL of 250 mg/L. Nitrate as nitrogen exceeds the public health goal (PHG) of 10 mg/L within the site boundary and at the southern property boundary, and periodically exceeds the MCL of 45 mg/L in well MW-4. Sulfate exceeds the MCL 250 mg/L within the site boundary, at the southern property boundary, and down gradient of the site at well MW-7. The MCLs, PHG, and Agricultural WQG for TDS, chloride, nitrate as nitrogen and sulfate are shown on Figures B9, B14, B15, and B16, respectively.

As shown on Figure G1 (Annex A) of the 2013 groundwater monitoring report (*Semi-Annual Monitoring Report, First Half 2013* [AEG, 2013a]), the groundwater plume appears to be focused on the area around wells MW-1, MW-5 and MW-4 and extends offsite approximately 350 feet toward wells MW-15, MW-16, and MW-17, and slightly beyond well MW-18. The source of these contaminants appears to be the landfill waste, as evidenced by these same constituents present in water encountered within the waste.

B1.4.3.2 VOCs

Groundwater monitoring data also indicate that, from 2006 through 2013, seven different VOCs were detected in groundwater samples collected from up gradient and down gradient site monitoring wells. The monitoring results are summarized in Table B3. Figure B18 shows VOC concentrations detected in the site wells.

Toluene was detected in up gradient wells MW-8 and MW-6, and styrene was detected in MW-8. The presence of these compounds in samples from up gradient wells suggest the presence of an up gradient, offsite source. Toluene was also detected in six down gradient wells, and styrene was detected in one down gradient well. Toluene was not detected in samples collected in 2004 during the Geoprobe® investigation, which also suggests the presence of an up gradient offsite source or sample contamination introduced in the field, during transport or at the laboratory.

Carbon disulfide was detected one time in 2007 in the sample from MW-1. Carbon disulfide was detected in 11 samples collected in 2004 during the Geoprobe® investigation. Carbon disulfide is a naturally occurring compound formed during the breakdown of organic material, but is also known to enter environmental media through its use as a solvent. The source for carbon disulfide may be due to degradation of landfill waste or the disposal of solvents at the site.

Tetrachloroethene (PCE), trichloroethene (TCE) and cis-1,2-dichloroethene (DCE) were detected in one sample from MW-1 during 2012, and cis-1,2-DCE was detected in one sample collected from nearby well MW-11 during 2013. The concentration of PCE was greater than the MCL of 5 µg/L; the concentration of TCE was greater than the PHG of 1.7 µg/L but less than the MCL of 5 µg/L; and the concentration of cis 1,2-DCE was less than the MCL of 6 µg/L. PCE was detected in four samples collected during the 2004 Geoprobe® investigation at concentrations less than the MCL of 5 µg/L, but greater than the PHG of 0.06 µg/L. The source for PCE, TCE, and cis-1,2-DCE may be the landfill due to the reported historical disposal of drycleaner waste at the site.

Acetone was detected in samples from three wells; this compound is a common laboratory contaminant and may not represent contamination from the landfill.

Benzene was detected in seven samples collected in 2004 during the Geoprobe® investigation at concentrations that exceeded the PHG 0.15 µg/L, and the benzene concentration in one sample (GP-5) slightly exceeded the MCL of 1 µg/L. Benzene has not been detected in site groundwater monitoring wells.

B1.4.3.3 SVOCs

One SVOC, bis-(2-Ethylhexyl) phthalate, was detected in groundwater samples from six of the site monitoring wells including up gradient well MW-6. This suggests a source that is up gradient of the site or some other external contamination was introduced to the water samples collected in the field, during transport, or at the laboratory.

Eight different SVOCs were detected in the groundwater samples collected from the soil borings including: phenol, benzyl alcohol, 3/4-methylphenol, diethyl phthalate, 4-nitrophenol, bis (2-ethylhexyl) phthalate, acetophenone, and di-n-butyl phthalate. None of the SVOCs detected have established MCLs or PHGs.

B1.5 FATE-AND-TRANSPORT OF CONTAMINANTS

The following section will address migration pathways, transport mechanisms, and contaminants detected at the site. The CSM is depicted in Figure B19.

B1.5.1 Migration Pathways

Migration pathways (also known as exposure pathways) are determined in part by land use. The future use of the site is expected to remain as a closed landfill, but surrounding land use could change over time, as residential land use is anticipated to the west and north.

A migration pathway consists of (1) a medium (e.g., air, surface water and groundwater) that is contaminated because it directly received a contaminant release or because a contaminant migrated into it from a distant release point, (2) a route through which the contaminant may be transported, and (3) a point-of-contact with groundwater, a human receptor, or an ecological receptor. The following contaminant migration pathways were considered during the development of this CSM:

- Soil – Contact with site soil is limited to site work associated with periodic maintenance and environmental monitoring activities. The clay cap and vegetative layer emplaced at the site are considered to be clean import. Contaminants in subsurface soil (i.e., the waste and daily cover material) are

buried beneath the clay cap, prohibiting contact. Therefore, this migration pathway is not considered complete.

- Soil gas – Vapor phases of VOCs in the pores of the waste material may be migrating laterally or to the ground surface. However, this migration pathway is not considered complete because contaminants have not been detected in site soil gas at concentrations that warrant further action.
- Surface outdoor air – Soil vapor concentrations of volatile constituents can permeate from soil gas to surface air, although gases and vapor chemicals would dilute greatly in outdoor air. However, this migration scenario is not considered complete because contaminants have not been detected in site soil gas at concentrations that warrant further action.
- Groundwater – Contaminants in affected groundwater have the potential to be transported in groundwater through dispersion, advection, and diffusion to the Auburn Ravine or offsite groundwater users. The TDS plume would be expected to result in nuisance issues associated with taste, odor, and color and is not expected to result in toxic affects to human health or the environment. Additionally, VOCs in groundwater can volatilize to soil vapor, and could be transported by dispersion and diffusion of soil vapor to outdoor air. Consequently, users of groundwater could be directly exposed via ingestion, vapor inhalation, and contact. However, VOCs have not been detected at down gradient locations on a consistent basis that would warrant further action.

B1.5.2 Transport Mechanisms

The primary transport mechanism at the site is groundwater transport. The potential for the TDS plume in groundwater to reach Auburn Ravine or groundwater users depends upon the location of the source, the condition of the source (discharge continuing or stopped), and the direction and velocity of migration.

The TDS plume is estimated to have migrated horizontally approximately 350 feet from the southern property boundary toward offsite wells MW-15, MW-16, MW-17 and MW-18.

B1.6 CSM CONCLUSIONS

Based on the lithologic data obtained from the February 2014 borings and review of historical information the following conclusions can be made:

- Sediments at the site consist primarily of silty sand (SM) and are considered to have low permeability (1×10^{-4} to 1×10^{-5} centimeters per second);

- The presence of a weathered, granitic rock was not confirmed beneath the site in the borings for PZ-1 through PZ-4;
- The distance between the bottom of the waste and underlying groundwater table does not meet the required minimum of five feet; and
- H&K considers the hydrogeologic system adequately characterized to support design of a corrective action that will achieve 5 feet of separation between the bottom of the waste and the groundwater table.

B1.7 REFERENCES

- AEG, 2013. *Report of the Corrective Action Plan (CAP) and Engineering Feasibility Study*. May 3.
- AEG, 2013a. *Semi-Annual Monitoring Report, First Half 2013*. June 19.
- California Geological Survey, 2011. *Preliminary Geologic Map of the Sacramento 30' x 60' Quadrangle, California*. Compilation and digital preparation by: Carlos I. Gutierrez.
- C.W. Fetter, 2001. *Applied Hydrogeology, Fourth Edition*.
- Earthtec, 1990. *Verification Monitoring Study Lincoln Inactive Landfill*. September 4.
- Helley, Edward J., and Harwood, David S., 1985. *Geologic Map of Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California*. U.S. Geological Survey Miscellaneous Field Studies Map MF-1790, 5 plates, scale 1:62,500, 1 pamphlet, 24 p. <http://pubs.usgs.gov/mf/1985/1790/>.
- Regional Water Quality Control Board (RWQCB), 2003. Order No. R5-2003-0142, *Waste Discharge Requirements for City of Lincoln, Lincoln Landfill Class III Landfill Post-Closure Maintenance and Corrective Action, Placer County*.

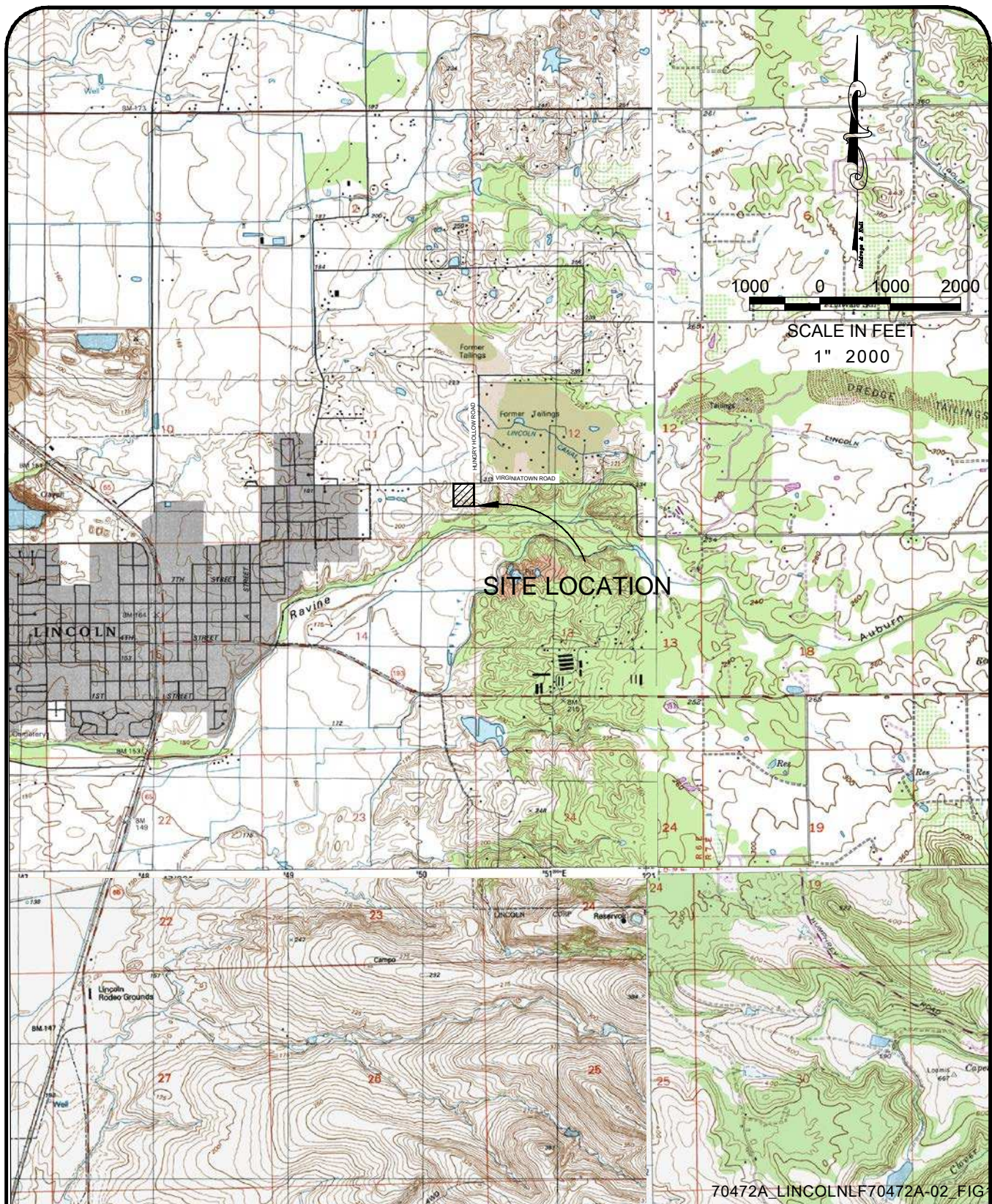
FIGURES

- B1 Site Location Map
- B2 Site Plan
- B3 Groundwater Hydrograph
- B4 Groundwater Potentiometric Surface Map – March 4, 2014
- B5 Groundwater Potentiometric Surface Map – March 11, 2014
- B6 Geologic Cross Section Alignment Map
- B7 Cross Sections A-A' and B-B'
- B8 Cross Section C-C' and D-D'
- B9 TDS in Groundwater – 2006 through 2013
- B10 Calcium in Groundwater – 2006 through 2013
- B11 Magnesium in Groundwater – 2006 through 2013
- B12 Potassium in Groundwater – 2006 through 2013
- B13 Sodium in Groundwater – 2006 through 2013
- B14 Chloride in Groundwater – 2006 through 2013
- B15 Nitrate as Nitrogen in Groundwater – 2006 through 2013
- B16 Sulfate in Groundwater – 2006 through 2013
- B17 Total Alkalinity in Groundwater – 2006 through 2013
- B18 Detected VOC in Groundwater – 2006 through 2013
- B19 Conceptual Site Model

TABLES

- B1 Groundwater Elevation
- B2 General Minerals in Groundwater – 2006 through 2013
- B3 Summary of Detected VOCs and SVOCs in Groundwater - 2006 through 2013

FIGURES



8 SEVILLE CT, SUITE 100
CHICO, CA 95928

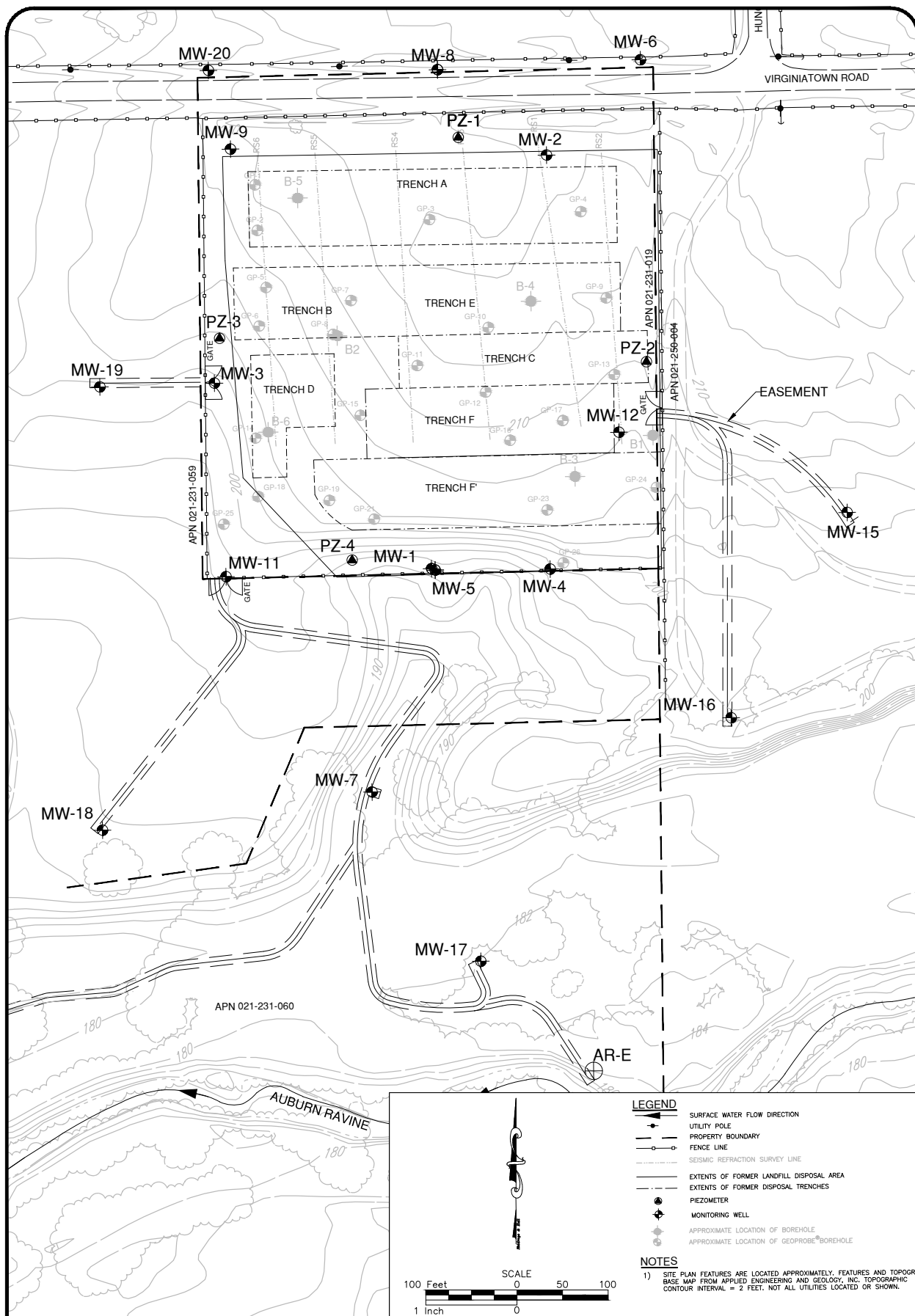
530 894-2487 FA 894-2437

SITE LOCATION MAP
CLOSED LINCOLN LANDFILL
LINCOLN, PLACER COUNTY, CALIFORNIA

PROJ NO.: 70472A-02

DATE: SEPT, 2014

FIGURE NO.: 1



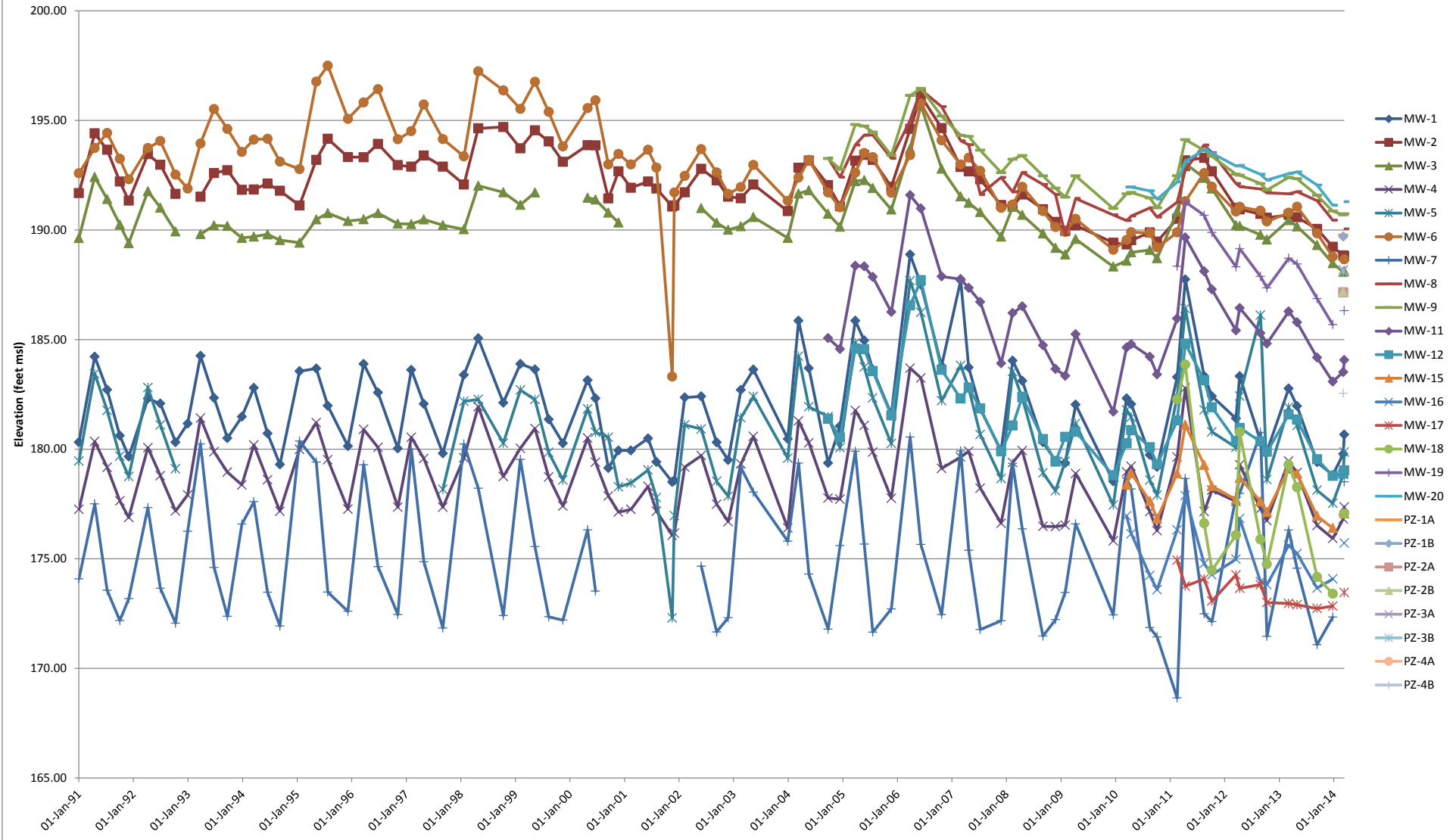
8 Seville Court, Suite 100
Chico, CA 95928
PH: 530-894-2487 FAX: 530-894-2437

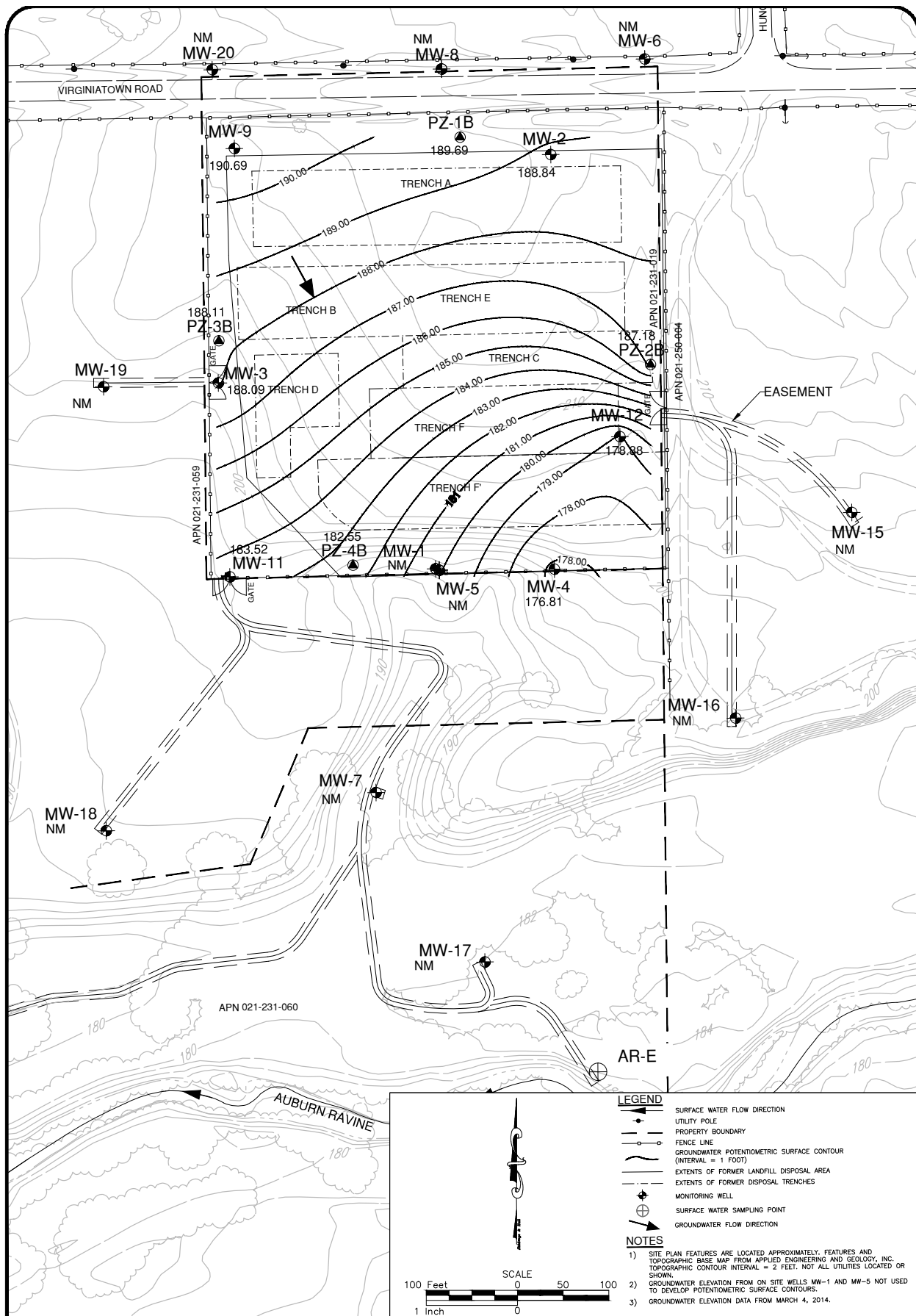
SITE PLAN **CLOSED LINCOLN LANDFILL** **LINCOLN, CALIFORNIA**

DRAWN BY: HJC
CHECKED BY: DMO
PROJECT NO.: 70472A-02
DATE: SEPT, 2014

FIGURE NO.
B2

Figure B3. Groundwater Hydrograph



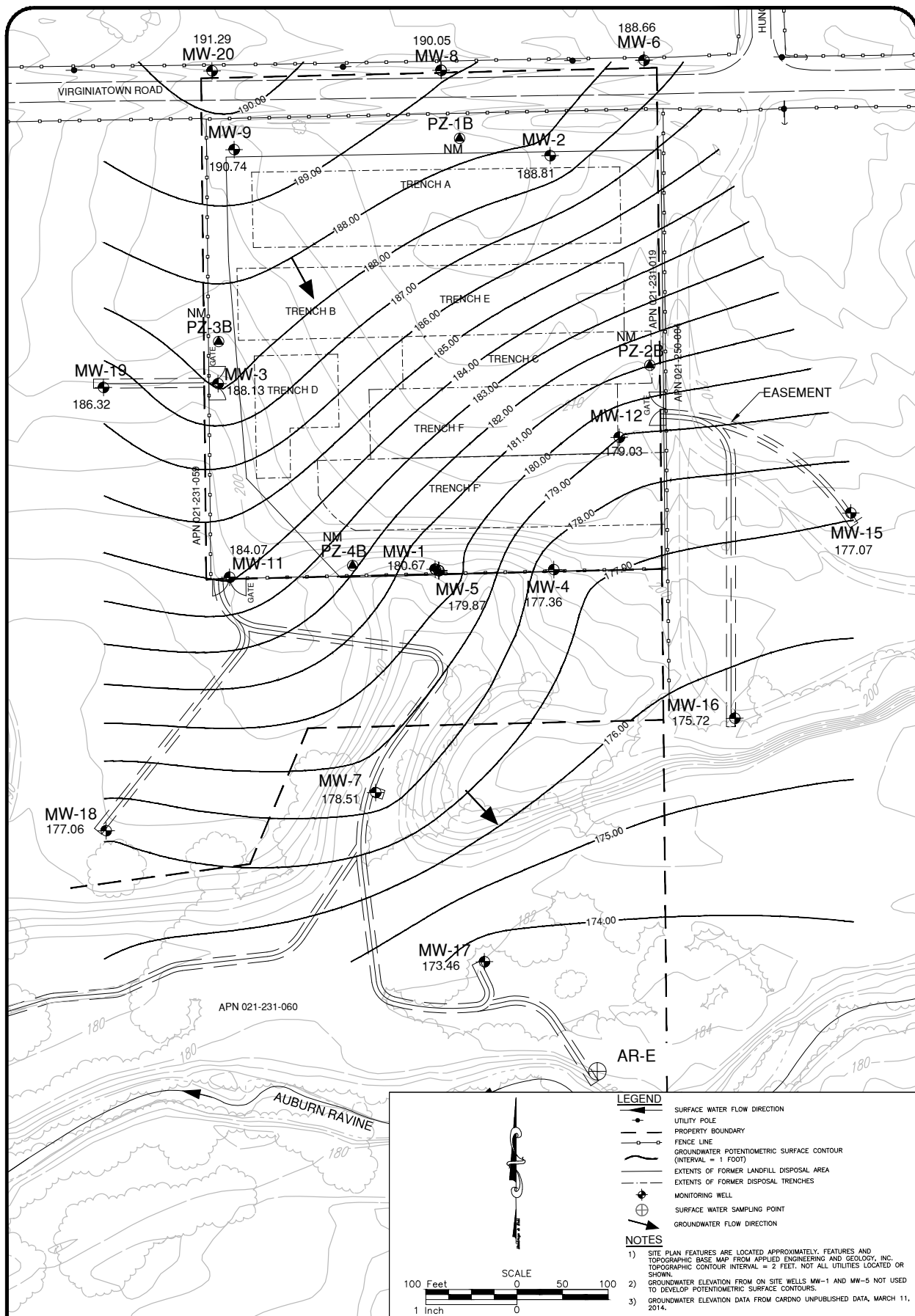


HK HOLDREGE & KULL
CONSULTING ENGINEERS - GEOLOGISTS
8 Seville Court, Suite 100
Chico, CA 95928
PH: 530-894-2487 FAX: 530-894-2437

**GROUNDWATER POTENTIOMETRIC
SURFACE MAP - MARCH 4, 2014
CLOSED LINCOLN LANDFILL
LINCOLN, CALIFORNIA**

DRAWN BY: HJC
CHECKED BY: SDC
PROJECT NO.: 70472A-02
DATE: SEPT, 2014

FIGURE NO.
B4



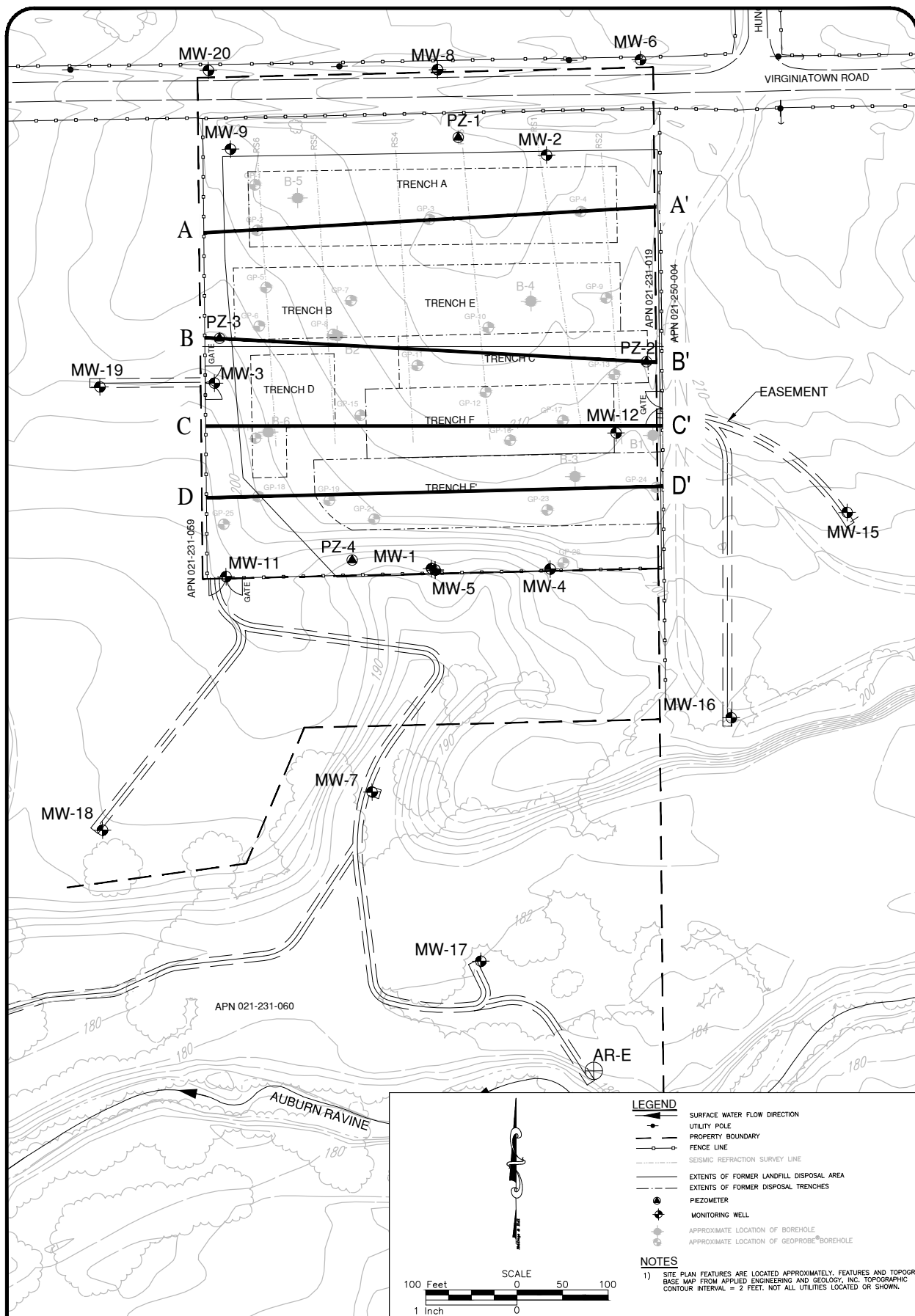
HK HOLDREGE & KULL
CONSULTING ENGINEERS - GEOLOGISTS

8 Seville Court, Suite 100
Chico, CA 95928
PH: 530-894-2487 FAX: 530-894-2437

**GROUNDWATER POTENTIOMETRIC
SURFACE MAP - MARCH 11, 2014
CLOSED LINCOLN LANDFILL
LINCOLN, CALIFORNIA**

DRAWN BY: HJC
CHECKED BY: SDC
PROJECT NO.: 70472-01
DATE: SEPT, 2014

FIGURE NO.
B5



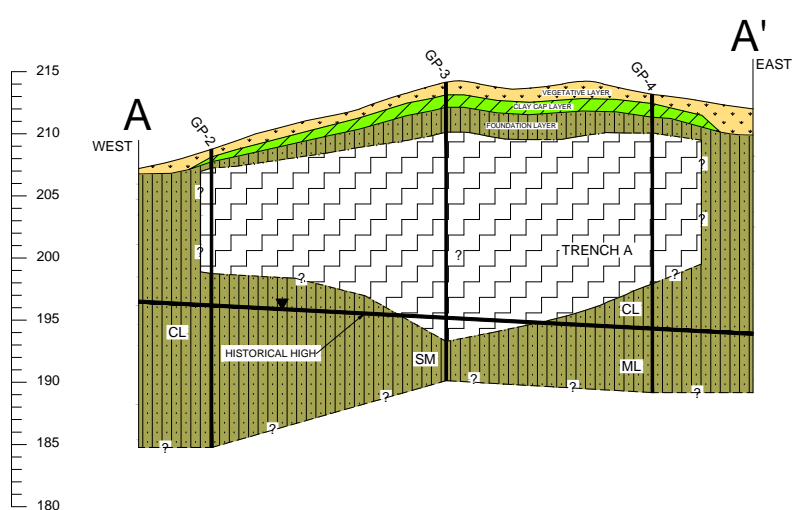
HK HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS

8 Seville Court, Suite 100
Chico, CA 95928
PH: 530-894-2487 FAX: 530-894-2437

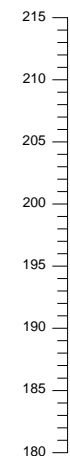
**GEOLOGIC CROSS SECTION
ALIGNMENT MAP
CLOSED LINCOLN LANDFILL
LINCOLN, CALIFORNIA**

DRAWN BY: HJC
CHECKED BY: DMO
PROJECT NO.: 70472A-02
DATE: SEPT, 2014





**FIGURE NO.
B6**

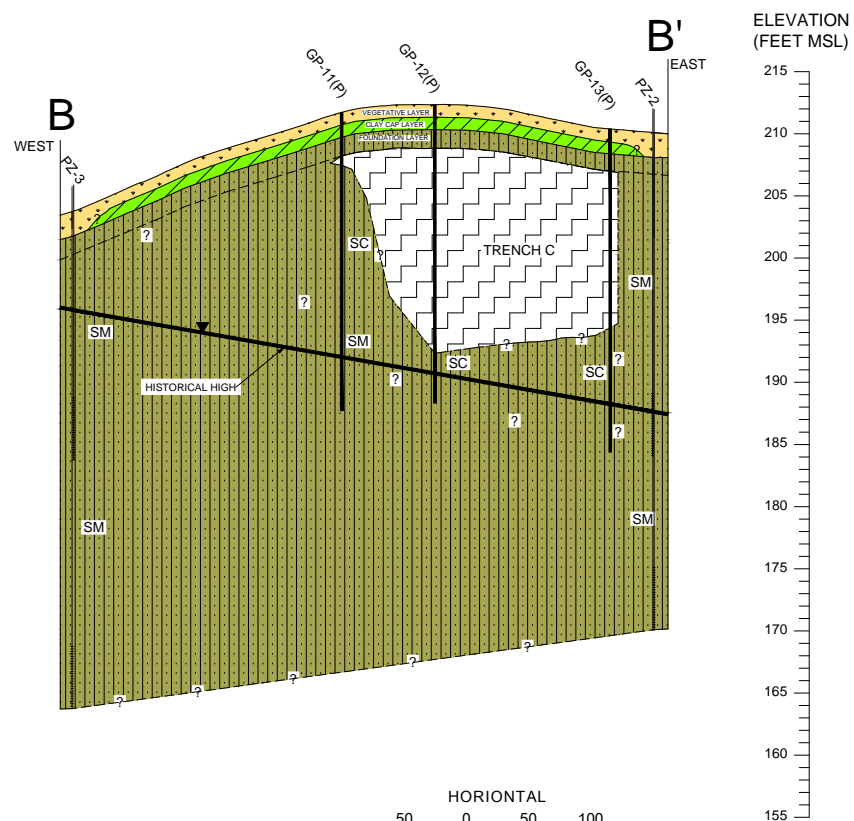


ELEVATION
(FEET MSL)

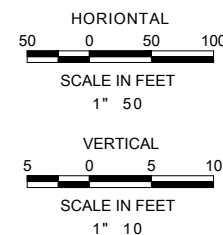
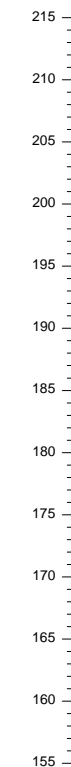


LEGEND

-  TOP SOIL - Mixture of onsite stockpiled soil and import soil from sewer treatment plan in Lincoln, CA
-  CLAY CAP - SOURCED FROM LINCOLN CLAY PRODUCTS
-  SM, SC, ML, CL - LOW PERMEABILITY MATERIALS
-  MUNICIPAL WASTE



ELEVATION
(FEET MSL)



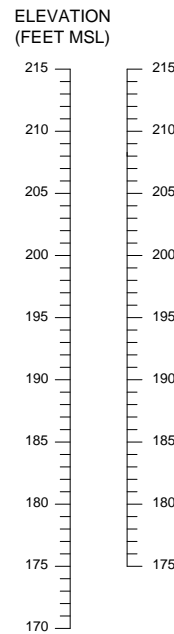
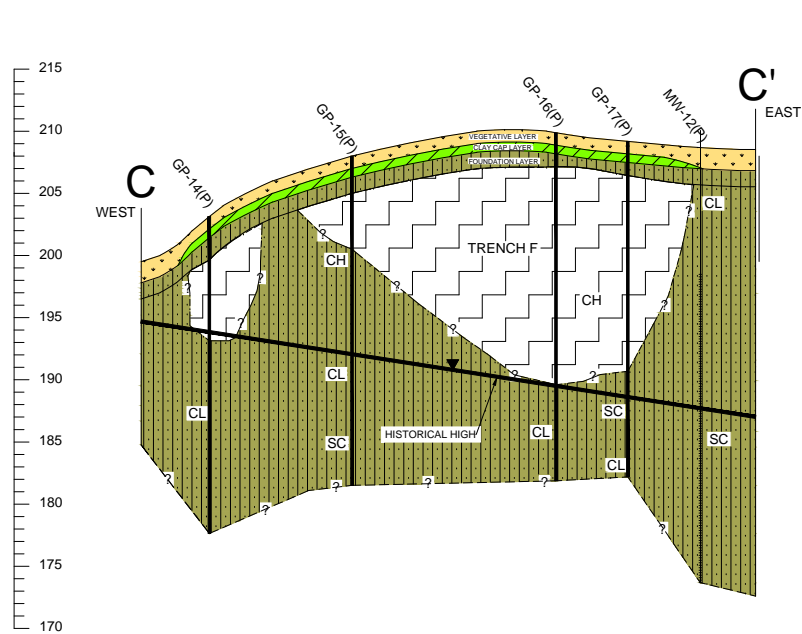
70472-01_FIG8_9_21_SECTION

HK HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS
8 SEVILLE COURT, SUITE 100
CHICO, CA 95928
530-894-2487 FAX 894-2437

CROSS SECTIONS A - A AND -
CLOSED LINCOLN LANDFILL
LINCOLN, CALIFORNIA

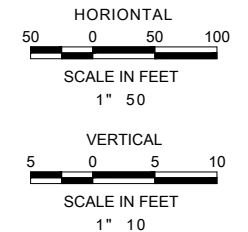
DRAWN Y HJC
CHECKED Y SDC
PROJECT NO 70472A-02
DATE SEPTEMBER, 2014

FIGURE NO
7



LEGEND

- VEGETATIVE LAYER - TOP SOIL, MIXTURE OF ONSITE STOCKPILED SOIL AND IMPORT SOIL FROM SEWER TREATMENT PLANT IN LINCOLN, CA.
- CLAY CAP - SOURCED FROM LINCOLN CLAY PRODUCTS
- SM, SC, CL, CH - LOW PERMEABILITY MATERIAL
- MUNICIPAL WASTE



70472-01_FIG8_9_21_SECTION

HK HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS

8 SEVILLE COURT, SUITE 100
CHICO, CA 95928
530-894-2487 FAX 894-2437

CROSS SECTION C - C AND D - D
CLOSED LINCOLN LANDFILL
LINCOLN, CALIFORNIA

DRAWN Y HJC
CHECKED Y SDC
PROJECT NO 70472A-02
DATE SEPTEMBER, 2014

FIGURE NO
8

Figure B9. TDS in Groundwater – 2006 through 2013

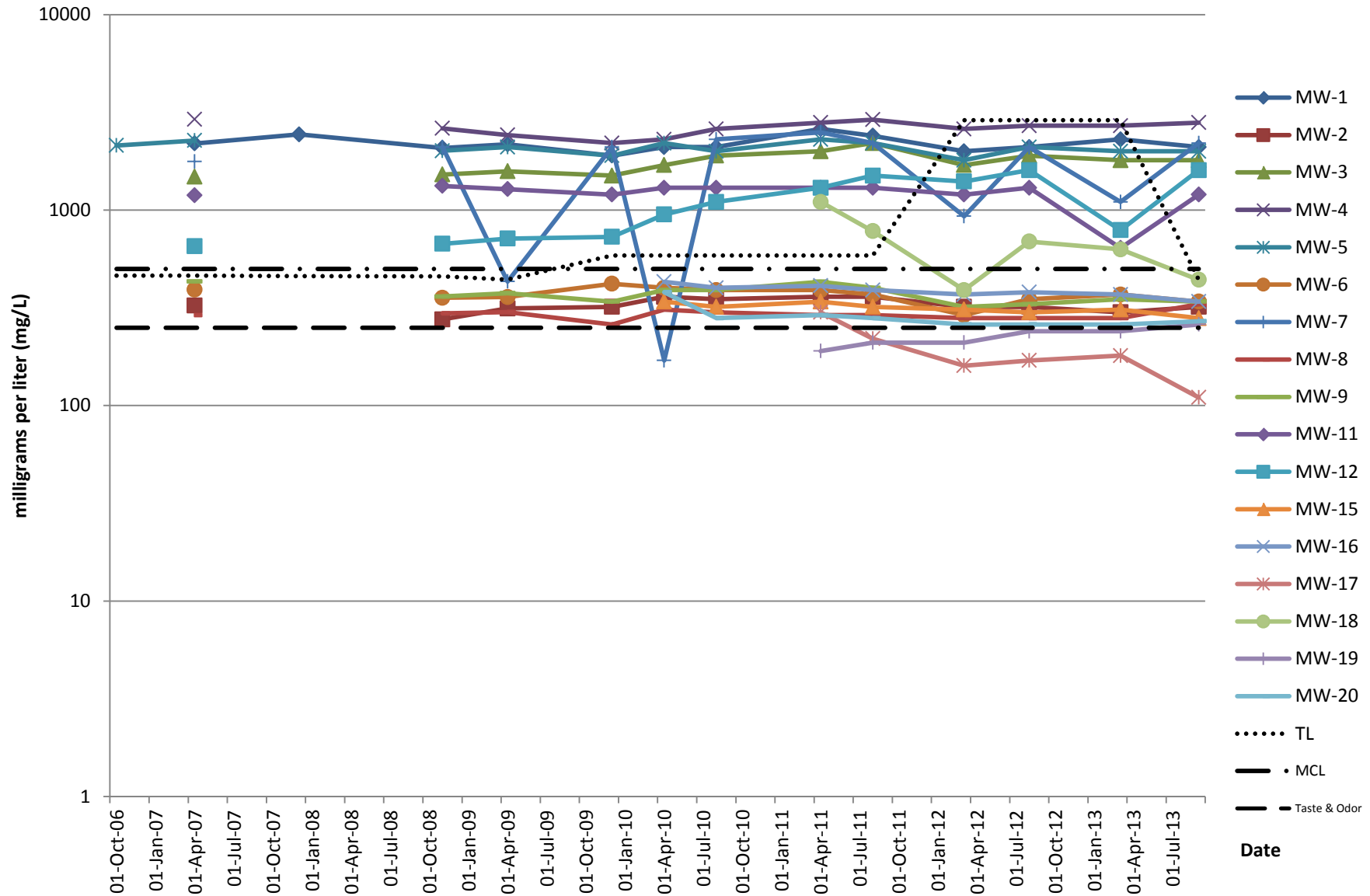


Figure B10. Calcium in Groundwater

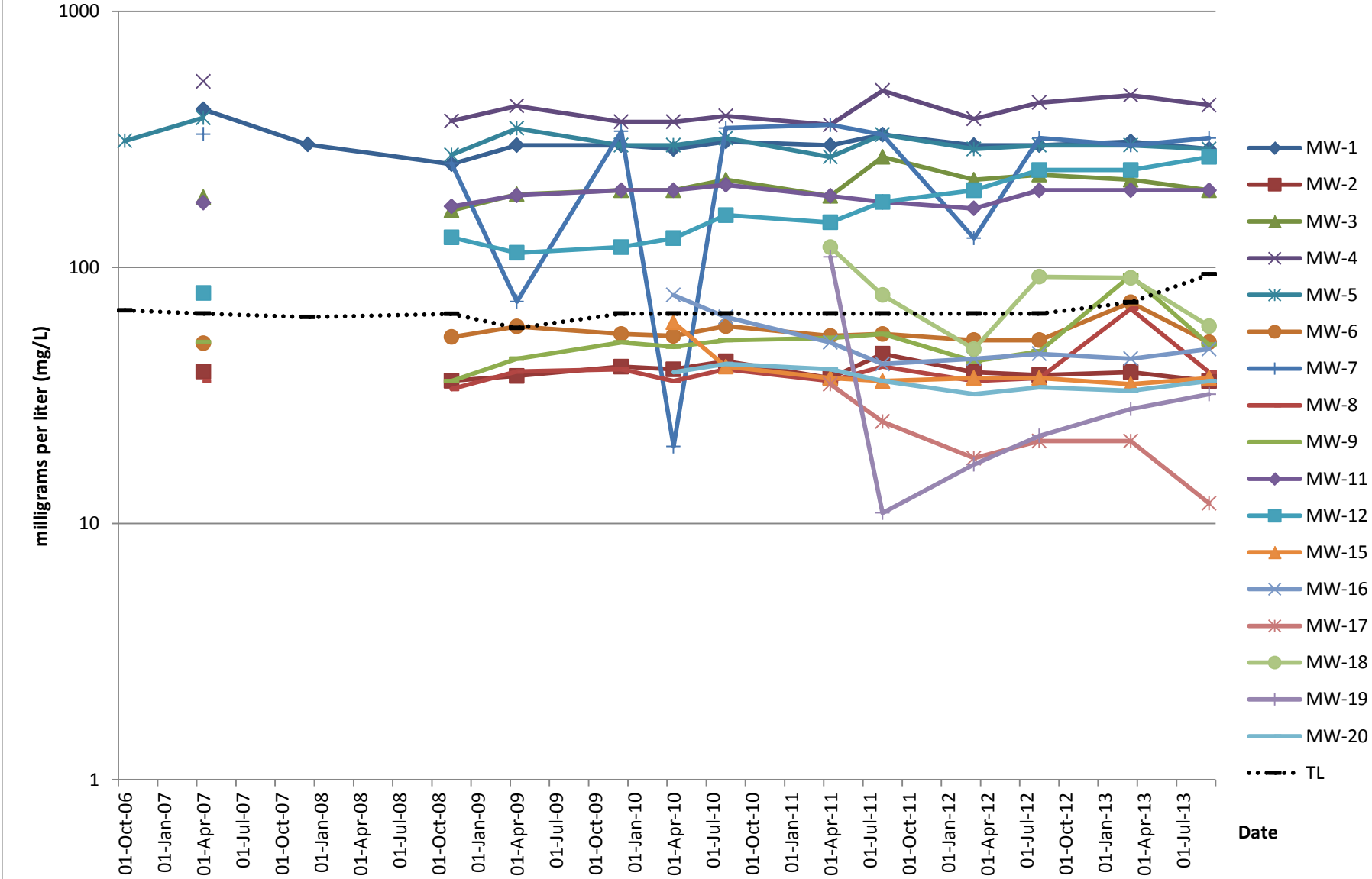


Figure B11. Magnesium in Groundwater – 2006 through 2013

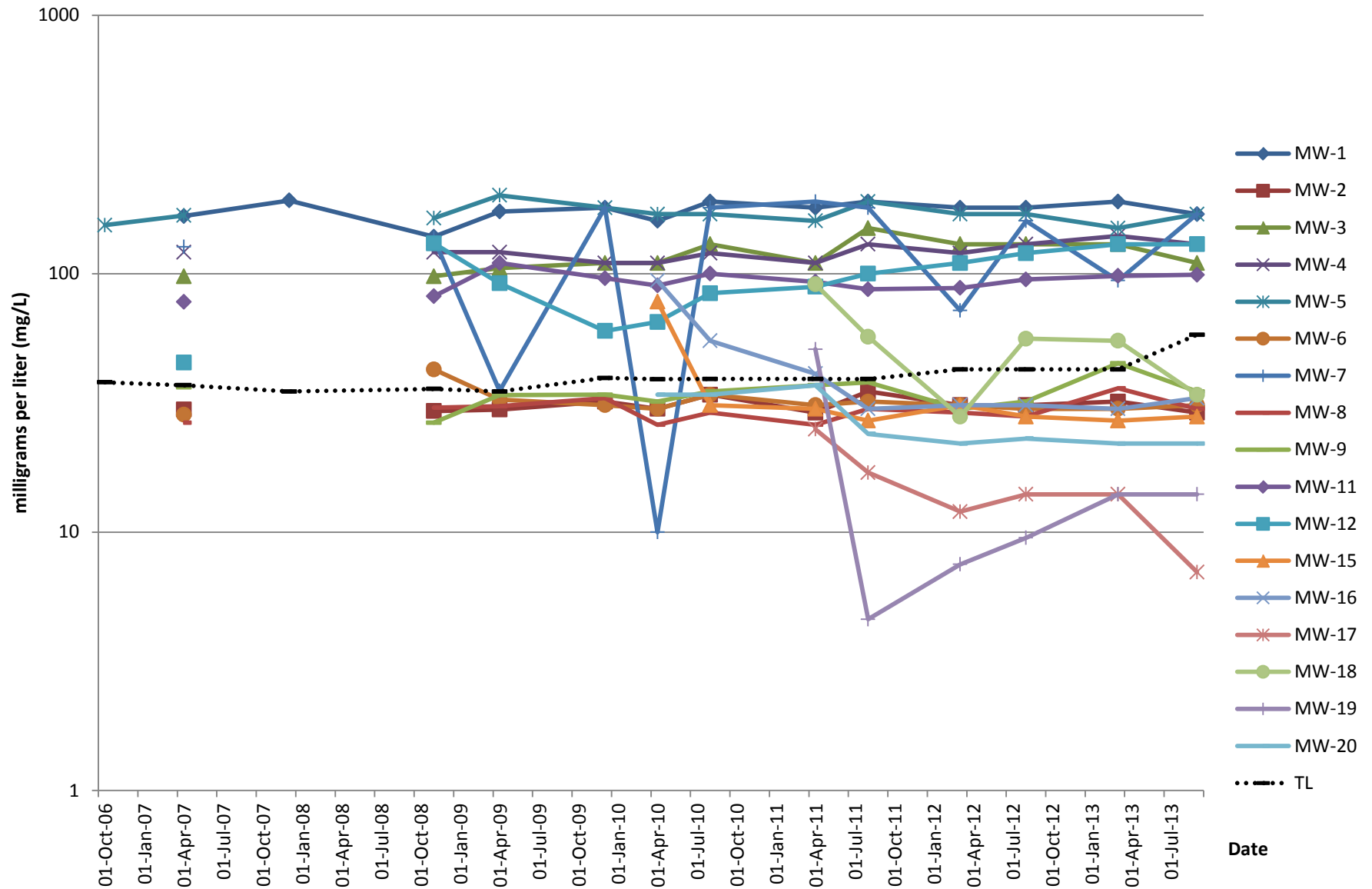


Figure B12. Potassium in Groundwater – 2006 through 2013

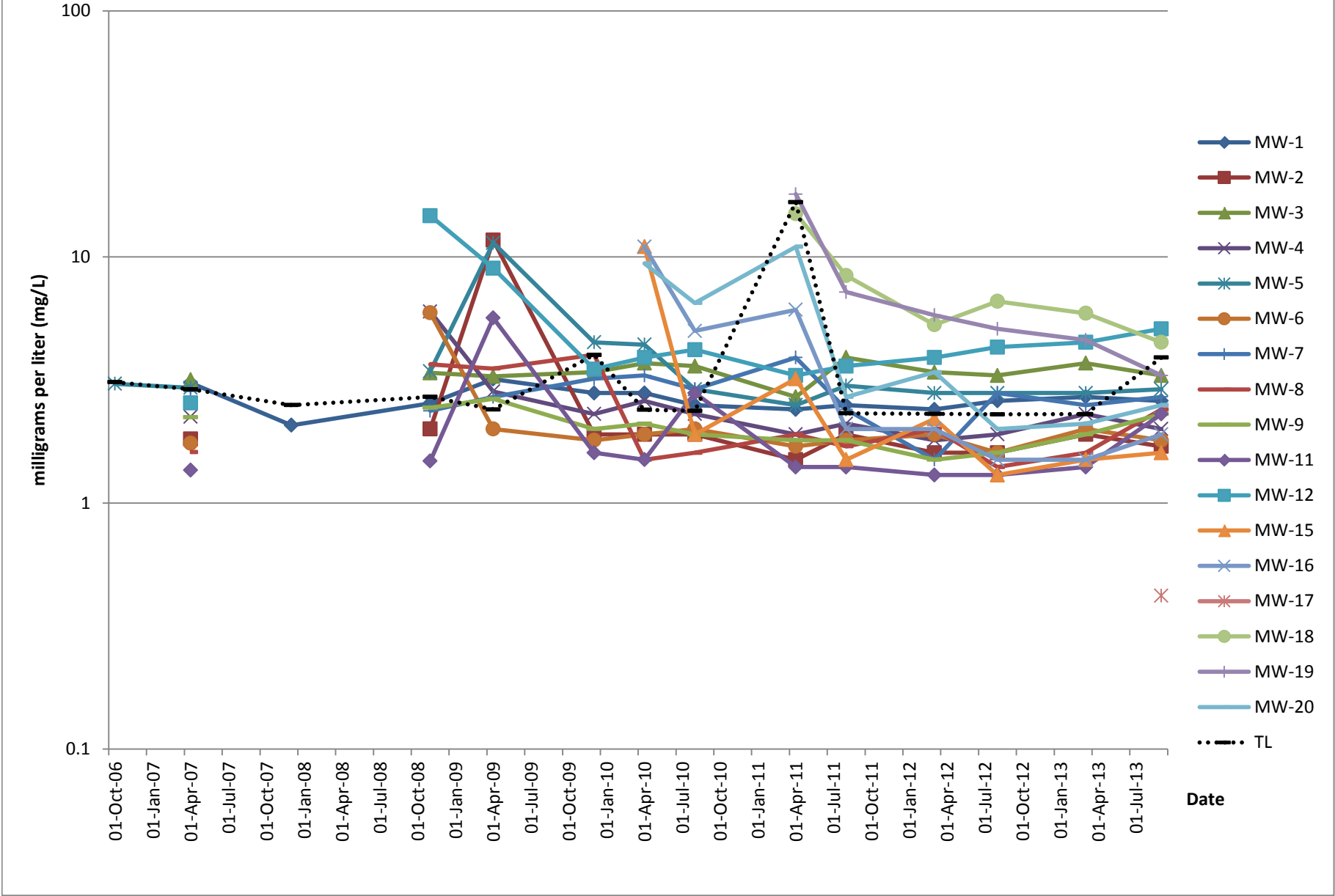


Figure B13. Sodium in Groundwater – 2006 through 2013

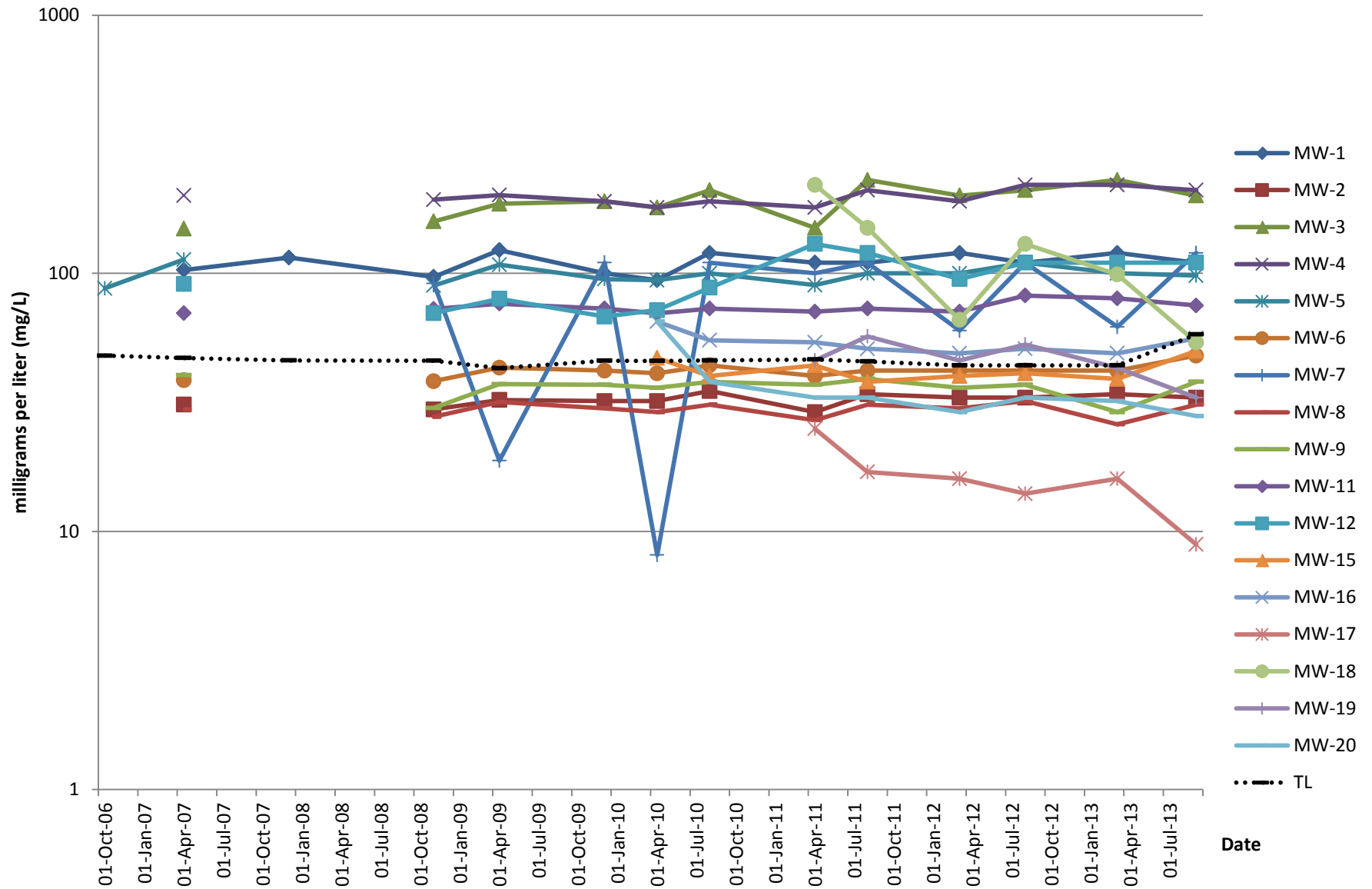


Figure B14. Chloride in Groundwater – 2006 through 2013

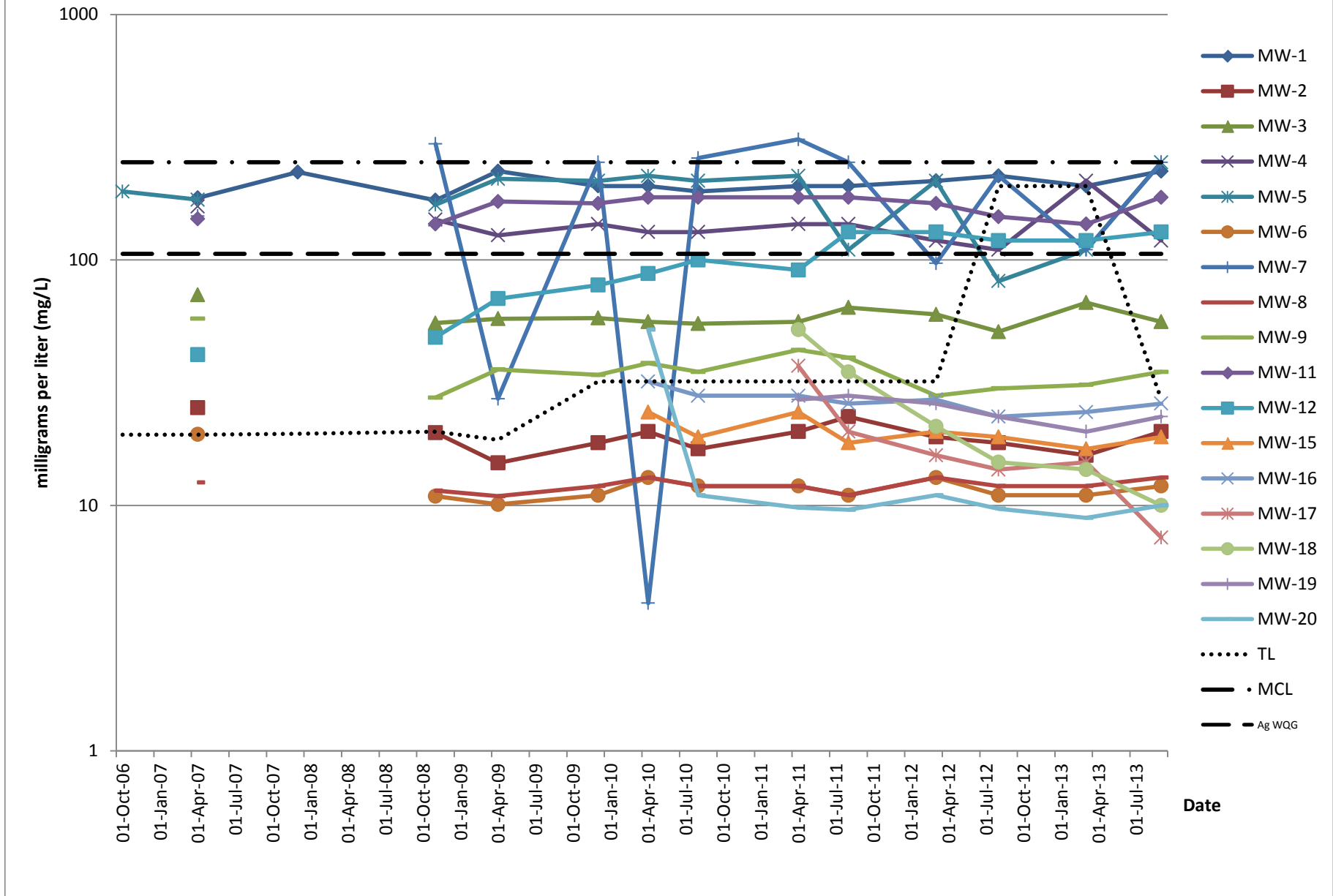


Figure B15. Nitrate as Nitrogen in Groundwater – 2006 through 2013

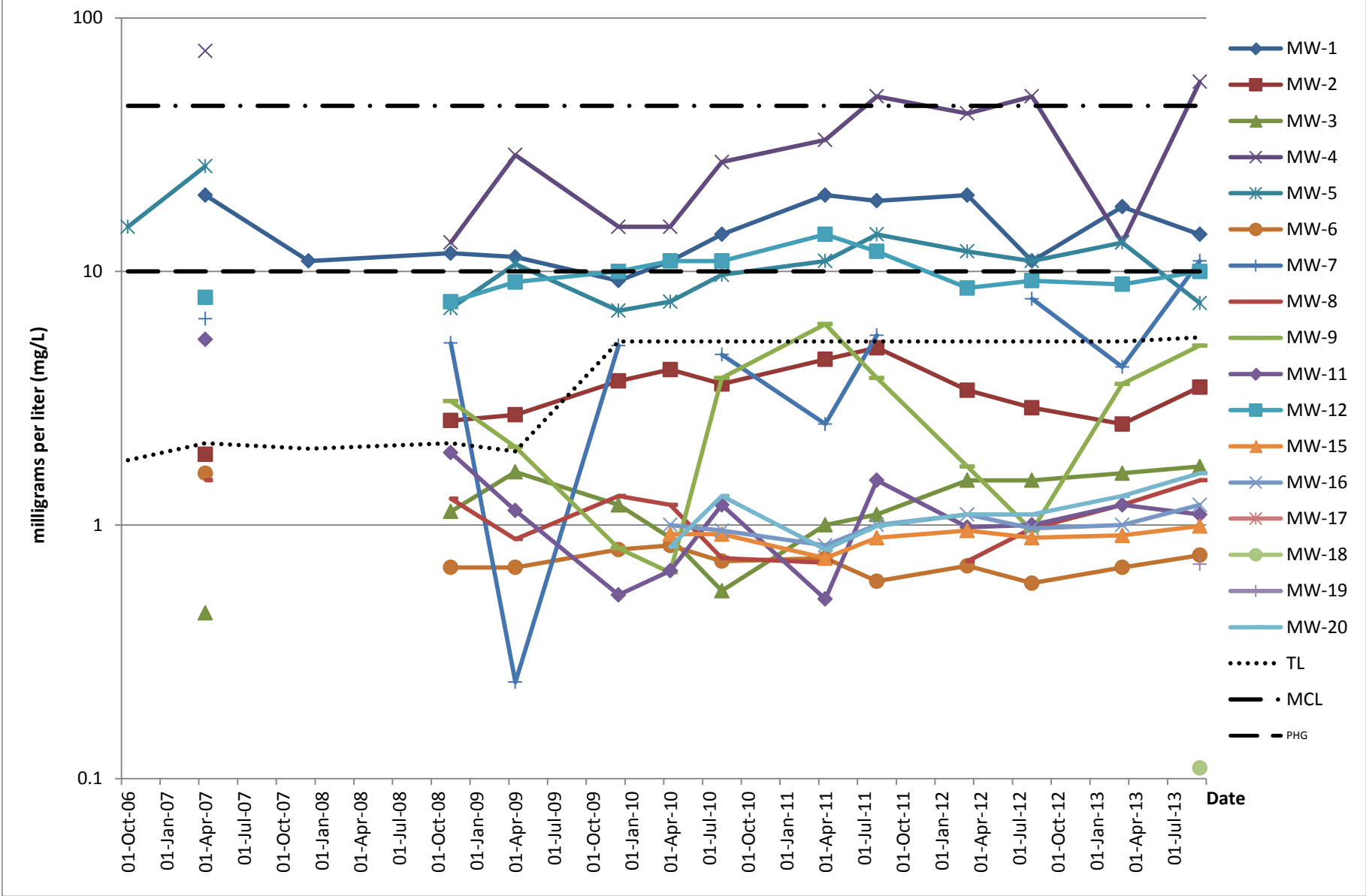


Figure B16. Sulfate in Groundwater – 2006 through 2013

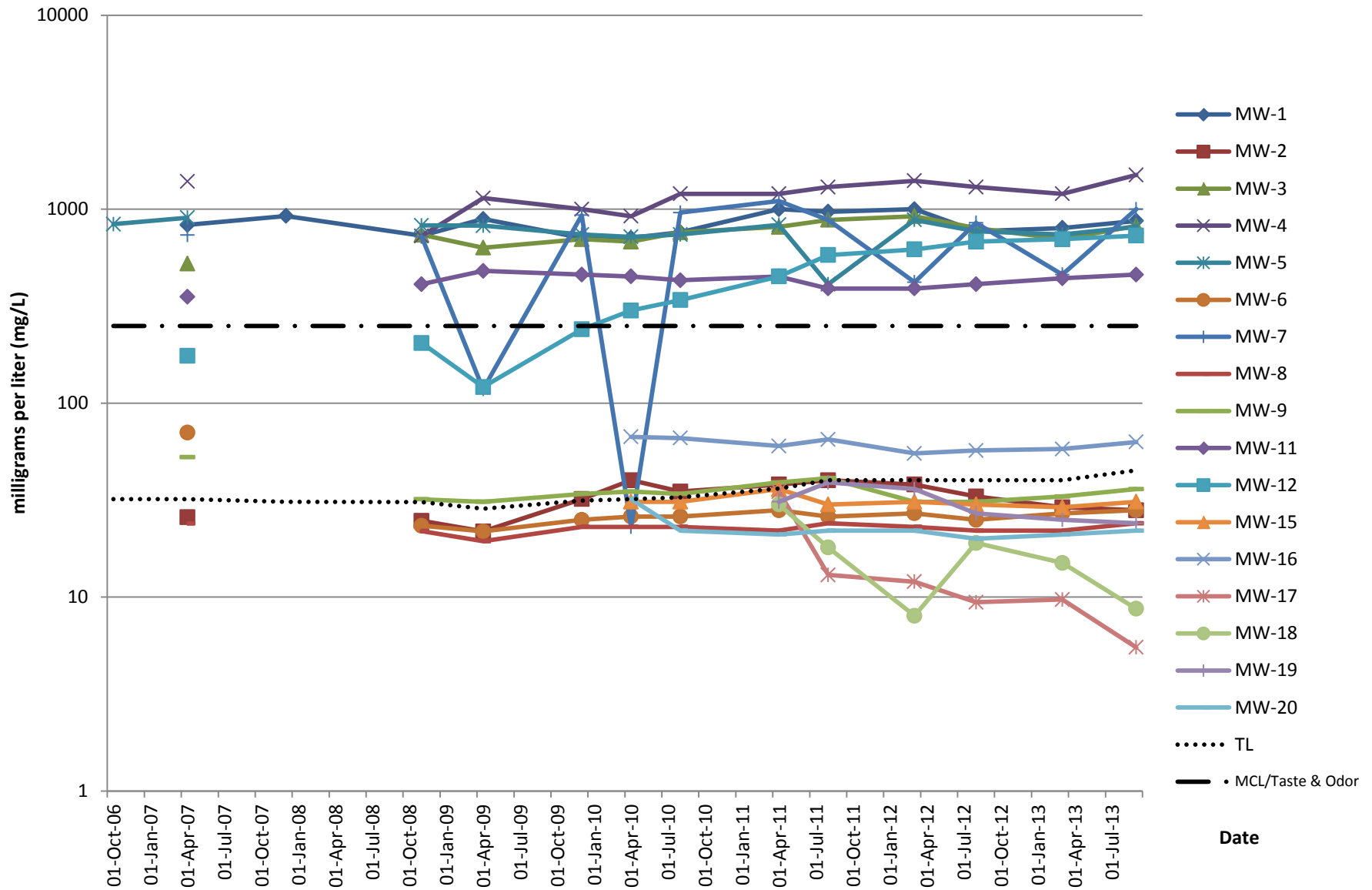
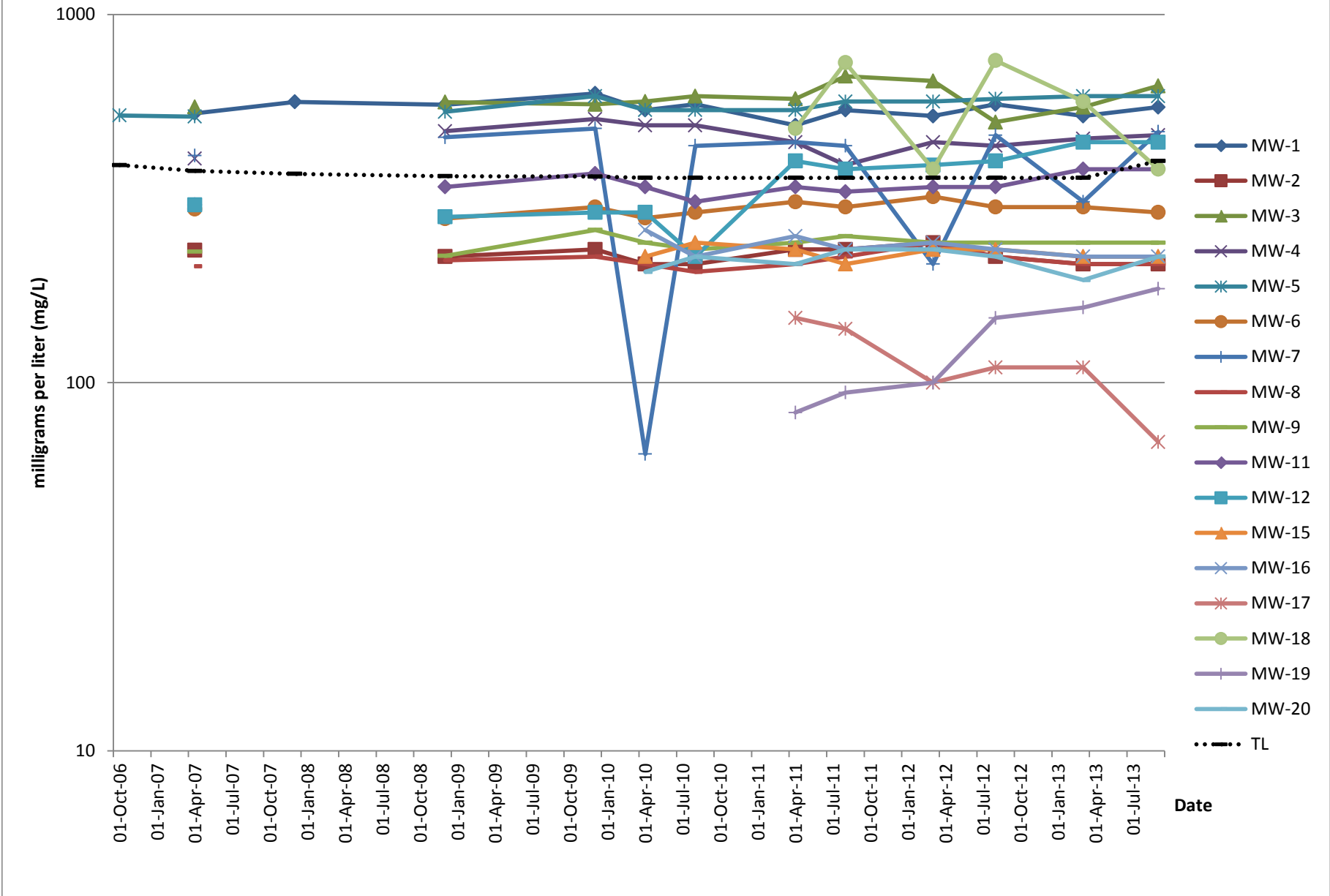
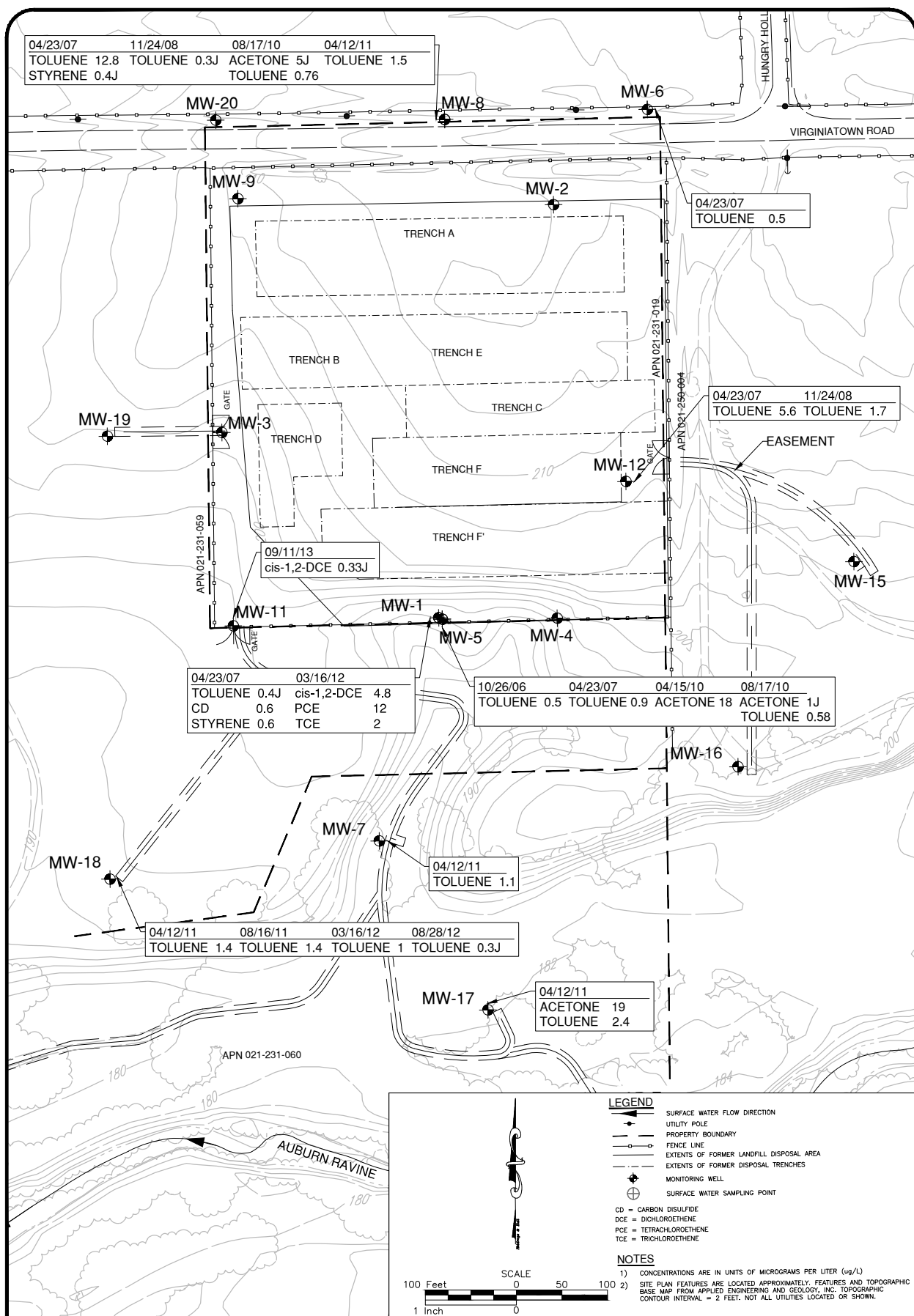


Figure B17. Total Alkalinity in Groundwater – 2006 through 2013





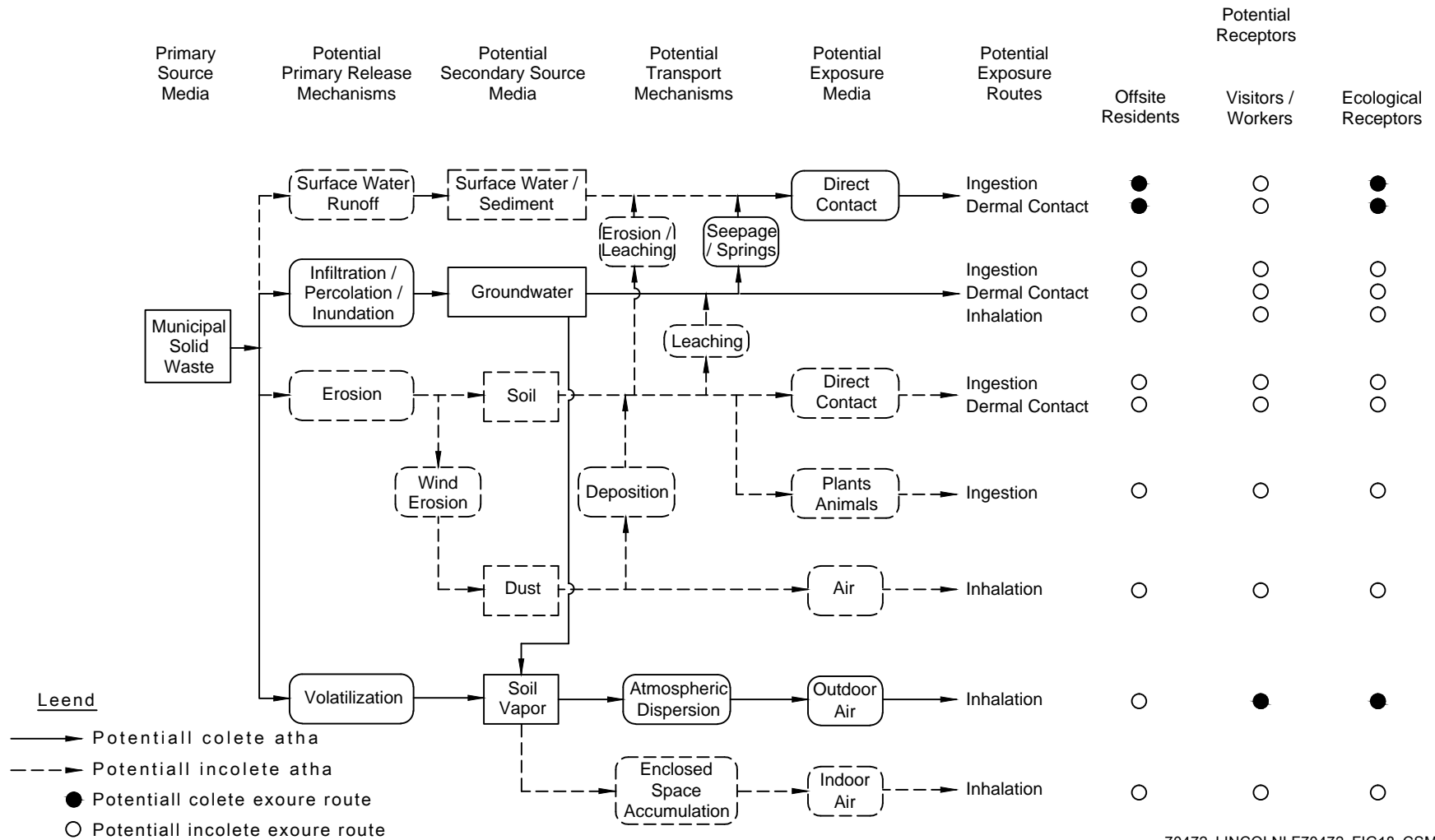
8 Seville Court, Suite 100
 Chico, CA 95928
 PH: 530-894-2487 FAX: 530-894-2437

DETECTED VOCs IN GROUNDWATER 2006 THROUGH 2013 CLOSED LINCOLN LANDFILL LINCOLN, CALIFORNIA

DRAWN BY: HJC
 CHECKED BY: DMO
 PROJECT NO.: 70472A-02
 DATE: SEPTEMBER, 2014

FIGURE NO.
B18

TYPICAL TRANSPORT MECHANISMS AND EXPOSURE MEDIA FOR HUMAN AND ECOLOGICAL RECEPTORS



70472_LINCOLNLF70472_FIG18_CSM



8 SEVILLE COURT, SUITE 100
CHICO, CA 95928
530 894-2487 FA 894-2437

CONCEPTUAL SITE MODEL
CLOSED LINCOLN LANDFILL
LINCOLN, PLACER COUNTY, CALIFORNIA

DRAWN Y HJC
CHECED Y JWM
PROJ NO 70472A-02
DATE SEPT,2014

FIGURE NO

19

TABLES

Table B1. Groundwater Elevation Data
Closed Lincoln Landfill

Date	MW-1 (feet msl)	MW-2 (feet msl)	MW-3 (feet msl)	MW-4 (feet msl)	MW-5 (feet msl)	MW-6 (feet msl)	MW-7 (feet msl)	MW-8 (feet msl)	MW-9 (feet msl)	MW-11 (feet msl)	MW-12 (feet msl)	MW-15 (feet msl)	MW-16 (feet msl)	MW-17 (feet msl)	MW-18 (feet msl)	MW-19 (feet msl)	MW-20 (feet msl)	PZ-1A (feet msl)	PZ-1B (feet msl)	PZ-2A (feet msl)	PZ-2B (feet msl)	PZ-3A (feet msl)	PZ-3B (feet msl)	PZ-4A (feet msl)	PZ-4B (feet msl)
01-Jan-91	180.32	191.68	189.63	177.25	179.46	192.59	174.08																		
17-Apr-91	184.22	194.41	192.42	180.35	183.44	193.74	177.50																		
09-Jul-91	182.71	193.66	191.41	179.17	181.77	194.43	173.56																		
02-Oct-91	180.62	192.21	190.25	177.64	179.68	193.25	172.18																		
01-Dec-91	179.66	191.34	189.40	176.88	178.75	192.31	173.18																		
07-Apr-92	182.31	193.46	191.77	180.07	182.81	193.74	177.33																		
29-Jun-92	182.08	192.98	191.02	178.79	181.10	194.06	173.65																		
09-Oct-92	180.32	191.65	189.93	177.18	179.10	192.53	172.06																		
29-Dec-92	181.17			177.91		191.89	176.25																		
25-Mar-93	184.26	191.52	189.81	181.42		193.95	180.24																		
24-Jun-93	182.34	192.60	190.21	179.88		195.52	174.60																		
21-Sep-93	180.50	192.73	190.18	178.95		194.61	172.37																		
27-Dec-93	181.48	191.83	189.64	178.37		193.56	176.58																		
17-Mar-94	182.80	191.85	189.70	180.19		194.13	177.60																		
17-Jun-94	180.72	192.12	189.80	178.60		194.16	173.47																		
08-Sep-94	179.30	191.79	189.54	177.17		193.12	171.93																		
17-Jan-95	183.56	191.12	189.42	179.99		192.78	180.37																		
09-May-95	183.68	193.20	190.48	181.21		196.77	179.41																		
25-Jul-95	181.98	194.16	190.77	179.52		197.50	173.48																		
07-Dec-95	180.14	193.33	190.41	177.26		195.07	172.60																		
21-Mar-96	183.89	193.32	190.49	180.90		195.82	179.29																		
25-Jun-96	182.58	193.93	190.77	180.08		196.43	174.64																		
05-Nov-96	180.03	192.96	190.29	177.35		194.14	172.45																		
03-Feb-97	183.62	192.89	190.27	180.54		194.51	180.00																		
28-Apr-97	182.07	193.40	190.48	179.57		195.73	174.86																		
02-Sep-97	179.81	192.89	190.22	177.35	178.17	194.15	171.84																		
21-Jan-98	183.39	192.08	190.03	179.60	182.18	193.36	180.23																		
27-Apr-98	185.06	194.64	192.02	181.94	182.27	197.24	178.22																		
12-Oct-98	182.12	194.70	191.72	178.75	180.27	196.37	172.41																		
03-Feb-99	183.89	193.73	191.15	180.04	182.70	195.53	179.53																		
12-May-99	183.64	194.55	191.71	180.94	182.26	196.76	175.55																		
12-Aug-99	181.36	194.04		178.73	179.85	195.39	172.35																		
15-Nov-99	180.27	193.11		177.40	178.59	193.81	172.20																		
28-Apr-00	183.15	193.87	191.47	180.51	181.84	195.56	176.32																		
20-Jun-00	182.32	193.86	191.39	179.40	180.77	195.92	173.52																		
14-Sep-00	179.14	191.44	190.79	177.86	180.54	192.99																			
21-Nov-00	179.94	192.68	190.34	177.13	178.28	193.47																			
12-Feb-01	179.94	191.93		177.25	178.46	192.99																			
07-Jun-01	180.49	192.21		178.30	179.05	193.66																			
02-Aug-01	179.42	191.89		177.17	177.79	192.85																			
16-Nov-01	178.50	191.07		176.07	172.30	183.31																			
30-Nov-01	178.57	191.12		176.17	176.97	191.71																			
07-Feb-02	182.36	191.72		179.18	181.11	192.47																			
29-May-02	182.41	192.79	191.00	179.71	180.92	193.69	174.66																		
09-Sep-02	180.31	192.27	190.33	177.49	178.53	192.63	171.66																		
25-Nov-02	179.50	191.52	190.01	176.69	177.85	191.65	172.31																		
18-Feb-03	182.70	191.45	190.17	179.33	181.43	191.96	179.16																		
13-May-03	183.63	192.08	190.59	180.58	182.40	192.97	178.04																		
29-Dec-03	180.47	190.86	189.64	176.40	179.59	191.33	175.80																		

Table B1. Groundwater Elevation Data
Closed Lincoln Landfill

Date	MW-1 (feet msl)	MW-2 (feet msl)	MW-3 (feet msl)	MW-4 (feet msl)	MW-5 (feet msl)	MW-6 (feet msl)	MW-7 (feet msl)	MW-8 (feet msl)	MW-9 (feet msl)	MW-11 (feet msl)	MW-12 (feet msl)	MW-15 (feet msl)	MW-16 (feet msl)	MW-17 (feet msl)	MW-18 (feet msl)	MW-19 (feet msl)	MW-20 (feet msl)	PZ-1A (feet msl)	PZ-1B (feet msl)	PZ-2A (feet msl)	PZ-2B (feet msl)	PZ-3A (feet msl)	PZ-3B (feet msl)	PZ-4A (feet msl)	PZ-4B (feet msl)
10-Mar-04	185.86	192.84	191.66	181.29	184.24	192.39	179.36																		
18-May-04	183.70	193.17	191.81	180.29	181.93	193.20	174.30																		
24-Sep-04	179.37	192.05	190.74	177.77	181.49	191.71	171.79	193.28	193.26	185.07	181.38														
13-Dec-04	181.05	191.09	190.15	177.72	180.07	191.03	175.60	192.41	192.77	184.57	180.54														
25-Mar-05	185.86	193.16	192.23	181.77	184.85	192.62	179.90	193.88	194.81	188.37	184.59														
24-May-05	184.96	193.43	192.28	181.08	183.75	193.51	175.67	194.33	194.74	188.34	184.56														
20-Jul-05	183.63	193.20	191.92	179.87	182.34	193.33	171.65	194.34	194.47	187.86	183.56														
21-Nov-05	181.59	191.97	190.93	177.76	180.26	191.70	172.71	193.27	193.41	186.26	181.54														
27-Mar-06	188.88	194.61	193.72	183.70	187.68	193.42	180.55	195.01	196.14	191.59	186.56														
07-Jun-06	187.52	196.12	195.69	183.25	186.24	195.78	175.65	196.40	196.46	190.98	187.71														
24-Oct-06	183.80	194.65	192.80	179.12	182.21	194.09	172.45	195.63	195.20	187.88	183.62														
28-Feb-07	187.71	192.88	191.53	179.64	183.82	192.99	179.92	194.07	194.32	187.76	182.31														
23-Apr-07	183.73	192.68	191.24	179.90	182.78	193.30	175.39	193.89	194.27	187.36	182.81														
09-Jul-07	181.84	192.31	190.82	178.22	180.67	192.70	171.77	191.62	193.64	186.72	181.86														
26-Nov-07	179.93	191.14	189.70	176.62	178.66	191.01	172.17	192.40	192.62	183.92	179.90														
11-Feb-08	184.04	191.07	191.06	179.39	183.54	191.16	179.35	191.74	193.23	186.21	181.08														
16-Apr-08	183.12	191.62	190.69	179.93	182.34	191.97	176.36	192.63	193.40	186.52	182.39														
01-Sep-08	180.32	190.95	189.84	176.48	178.92	190.86	171.47	192.08	192.47	184.74	180.46														
24-Nov-08	179.47	190.37	189.18	176.47	178.10	190.13	172.22	191.62	191.91	183.66	179.43														
28-Jan-09	179.37	189.96	188.88	176.53	179.44	189.91	173.46	189.79	191.50	183.35	180.56														
08-Apr-09	182.03	190.21	189.59	178.89	181.17	190.51	176.59	191.44	192.47	185.25	180.79														
16-Dec-09	178.53	189.42	188.33	175.82	177.45	189.10	172.44	190.69	190.98	181.71	178.81														
15-Mar-10	182.32	189.34	188.60	178.96	181.79	189.55	178.68	190.43	191.65	184.64	180.27	178.38	176.95												
15-Apr-10	182.05	189.53	188.98	179.22	181.46	189.90	178.18	190.64	191.71	184.79	180.87	178.90	176.14												
17-Aug-10	179.74	189.89	189.09	177.15	178.59	189.87	171.86	191.01	191.46	184.22	180.09	177.63	174.24												
05-Oct-10	179.19	189.47	188.71	176.28	177.90	189.21	171.43	190.59	191.01	183.41	179.31	176.83	173.59												
16-Feb-11	183.29	190.51	190.84	179.64	182.41	189.89	168.65	191.27	192.48	185.96	181.31	178.89	176.32	174.94	182.27	188.35									
12-Apr-11	187.75	193.18	193.04	182.79	186.42	191.31	178.66	192.75	194.12	189.66	184.82	181.11	177.88	173.75	183.86	191.29	193.12								
16-Aug-11	183.34	193.29	192.38	177.15	181.79	192.60	172.49	193.88	193.64	188.12	183.14	179.28	174.78	174.08	176.62	190.67	193.67								
07-Oct-11	182.42	192.68	191.89	178.13	180.79	191.98	172.13	193.53	193.36	187.29	181.91	178.32	174.27	173.07	174.48	189.89	193.50								
16-Mar-12	181.40	191.01	190.22	177.61	180.08	190.84	177.83	192.12	192.55	185.42	180.37	177.70	174.98	174.26	176.08	188.32	192.92								
10-Apr-12	183.33	190.94	190.18	179.29	182.42	191.06	177.98	191.98	192.50	186.44	180.97	178.69	176.84	173.65	180.78	189.15	192.95								
27-Aug-12	180.37	190.73	189.78	177.27	186.12	190.88	180.76	191.87	192.12	185.30	180.35	177.62	173.95	173.82	175.88	187.88	192.54								
09-Oct-12	179.91	190.56	189.56	176.74	178.61	190.39	171.46	191.70	191.82	184.82	179.88	177.13	173.82	173.00	174.75	187.36	192.28								
04-Mar-13	182.77	190.69	190.45	179.46	181.91	190.79	176.31	191.65	192.40	186.28	181.58	179.11	175.61	172.96	179.29	188.71	192.57								
29-Apr-13	181.97	190.58	190.16	178.93	181.08	191.06	174.57	191.75	192.34	185.79	181.35	178.88	175.24	172.90	178.26	188.45	192.65								
10-Sep-13	179.41	190.05	189.31	176.52	178.13	189.85	171.08	191.34	191.58	184.18	179.54	176.95	173.66	172.73	174.17	186.87	192.05								
24-Dec-13	178.82	189.23	188.48	175.93	177.53	188.78	172.34	190.45	190.86	183.08	178.78	176.40	174.08	172.84	173.40	185.68	191.13								
04-Mar-14	179.78	188.84	188.09	176.82	178.85			190.69	190.69	183.52	178.88							189.77	189.70	187.15	187.18	188.18	188.11	dry	182.55
11-Mar-14	180.67	188.81	188.13	177.36	179.87	188.66	178.51	190.05	190.74	184.07	179.03	177.07	175.72	173.46	177.06	186.32	191.29								

(a) Blank entries indicate no data for the monitoring event.
msl = mean sea level

Table B2. General Minerals in Groundwater - 2006 through 2013
Closed Lincoln Landfill

Total Dissolved Solids (mg/L)																		
Sample Date	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-11	MW-12	MW-15	MW-16	MW-17	MW-18	MW-19	MW-20	TL
26-Oct-06					2140													462
23-Apr-07	2190	325	1480	2910	2270	392	1770	290	431	1190	653							462
04-Dec-07	2440																	460
25-Nov-08	2080	276	1520	2620	2010	356	2100	296	361	1330	672							457.7
08-Apr-09	2170	314	1580	2420	2100	359	431	301	376	1280	715							441.1
17-Dec-09	1900	320	1500	2200	1900	420	2100	260	340	1200	730							586
15-Apr-10	2100	360	1700	2300	2200	400	170	310	390	1300	950	340	430				380	586
17-Aug-10	2100	350	1900	2600	2000	390	2300	300	390	1300	1100	320	400				280	586
12-Apr-11	2600	360	2000	2800	2300	390	2500	290	430	1300	1300	340	410	300	1100	190	290	586
16-Aug-11	2400	360	2200	2900	2200	370	2200	290	400	1300	1500	320	390	220	780	210	280	586
16-Mar-12	2000	320	1700	2600	1800	290	930	280	320	1200	1400	310	370	160	390	210	260	2880
28-Aug-12	2100	320	1900	2700	2100	350	2100	280	330	1300	1600	300	380	170	690	240	260	2880
05-Mar-13	2300	300	1800	2700	2000	370	1100	280	350	640	790	310	370	180	630	240	260	2880
11-Sep-13	2100	320	1800	2800	2000	340	2200	330	340	1200	1600	280	340	110	440	260	270	440
Calcium (mg/L)																		
Sample Date	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-11	MW-12	MW-15	MW-16	MW-17	MW-18	MW-19	MW-20	TL
26-Oct-06					312													68
23-Apr-07	414	39.2	188	532	384	50.5	331	36	51.1	179	79.5							66
04-Dec-07	302																	64
25-Nov-08	253	36.1	167	373	275	53.5	255	33.5	36	173	131							65.9
08-Apr-09	300	37.7	193	427	349	58.8	73.5	39.2	44	191	114							58
17-Dec-09	300	41	200	370	300	55	340	40	51	200	120							66
15-Apr-10	290	40	200	370	300	54	20	36	49	200	130	61	78				39	66
17-Aug-10	310	43	220	390	320	59	350	40	52	210	160	41	64				42	66
12-Apr-11	300	37	190	360	270	54	360	36	53	190	150	37	51	35	120	110	40	66
16-Aug-11	330	46	270	490	330	55	330	41	55	180	180	36	42	25	78	11	36	66
16-Mar-12	300	39	220	380	290	52	130	36	43	170	200	37	44	18	48	17	32	66
28-Aug-12	300	38	230	440	300	52	320	37	47	200	240	37	46	21	92	22	34	66
05-Mar-13	310	39	220	470	300	73	300	69	93	200	240	35	44	21	91	28	33	73
11-Sep-13	290	36	200	430	290	51	320	39	50	200	270	37	48	12	59	32	36	94

Table B2. General Minerals in Groundwater - 2006 through 2013
Closed Lincoln Landfill

Magnesium (mg/L)																		
Sample Date	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-11	MW-12	MW-15	MW-16	MW-17	MW-18	MW-19	MW-20	TL
26-Oct-06					154													38
23-Apr-07	167	29.8	97.6	121	168	28.5	127	26.5	36.3	77.8	45.3							37
04-Dec-07	192																	35
25-Nov-08	139	29.4	97.7	121	164	42.6	137	30.3	26.5	81.7	131							35.8
08-Apr-09	174	29.8	105	121	201	32.6	35.2	30.7	33.9	110	91.8							35
17-Dec-09	180	32	110	110	180	31	180	33	34	96	60							39.49
15-Apr-10	160	30	110	110	170	30	10	26	32	90	65	78	94				34	39.04
17-Aug-10	190	34	130	120	170	34	180	29	35	100	84	31	55				34	39.13
12-Apr-11	180	29	110	110	160	31	190	26	37	93	89	30	41	25	91	51	37	39.11
16-Aug-11	190	35	150	130	190	32	180	30	38	87	100	27	30	17	57	4.6	24	39.09
16-Mar-12	180	31	130	120	170	31	72	29	30	88	110	31	31	12	28	7.5	22	42.6
28-Aug-12	180	31	130	130	170	30	160	28	32	95	120	28	31	14	56	9.5	23	42.6
05-Mar-13	190	32	130	140	150	30	94	36	45	98	130	27	30	14	55	14	22	42.6
11-Sep-13	170	29	110	130	170	31	170	30	35	99	130	28	33	7.0	34	14	22	58
Potassium (mg/L)																		
Sample Date	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-11	MW-12	MW-15	MW-16	MW-17	MW-18	MW-19	MW-20	TL
26-Oct-06					3.05													3.1
23-Apr-07	3.08	1.82	3.17	2.24	2.94	1.75	2.84	1.61	2.23	1.36	2.55							2.9
04-Dec-07	2.07																	2.5
25-Nov-08	2.54	2	3.38	6	3.43	5.93	2.37	3.66	2.44	1.48	14.7							2.7
08-Apr-09	3.19	11.7	3.27	2.84	11.4	2	2.7	3.52	2.65	5.65	9							2.4
17-Dec-09	2.8	1.9	3.4	2.3	4.5	1.8	3.2	4	2	1.6	3.5							4
15-Apr-10	2.8	1.9	3.7	2.6	4.4	1.9	3.3	1.5	2.1	1.5	3.9	11	11				9.4	2.392
17-Aug-10	2.5	1.9	3.6	2.3	2.9	2	2.9	1.6	1.9	2.8	4.2	1.9	5				6.5	2.369
12-Apr-11	2.4	1.5	2.7	1.9	2.5	1.7	3.9	1.9	1.8	1.4	3.3	3.2	6.1		15	18	11	16.7
16-Aug-11	2.5	1.9	3.9	2.1	3	1.8	2.4	1.7	1.8	1.4	3.6	1.5	2		8.4	7.2	2.7	2.315
16-Mar-12	2.4	1.6	3.4	1.8	2.8	1.9	1.5	2	1.5	1.3	3.9	2.2	2		5.3	5.8	3.4	2.302
28-Aug-12	2.6	1.6	3.3	1.9	2.8	1.6	2.8	1.4	1.6	1.3	4.3	1.3	1.5		6.6	5.1	2	2.293
05-Mar-13	2.7	1.9	3.7	2.3	2.8	2	2.5	1.6	1.9	1.4	4.5	1.5	1.5		5.9	4.6	2.1	2.298
11-Sep-13	2.6	1.7	3.3	2	2.9	1.8	2.7	2.4	2.3	2.3	5.1	1.6	1.9	0.42	4.5	3.3	2.5	3.9

Table B2. General Minerals in Groundwater - 2006 through 2013
Closed Lincoln Landfill

Sodium (mg/L)																		
Sample Date	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-11	MW-12	MW-15	MW-16	MW-17	MW-18	MW-19	MW-20	TL
26-Oct-06					87.5													48
23-Apr-07	103	31	149	200	113	38.5	90.4	29.7	40.3	70	90.9							47
04-Dec-07	115																	46
25-Nov-08	96.9	29.7	159	193	89.7	38.2	91.4	27.8	30.1	72.8	70.1							45.9
08-Apr-09	123	32.3	186	201	108	43.1	18.8	31.7	37.2	76.3	79.7							42.9
17-Dec-09	100	32	190	190	95	42	110	30	37	73	68							45.9
15-Apr-10	94	32	180	180	94	41	8.1	29	36	70	72	47	65				65	45.75
17-Aug-10	120	35	210	190	100	44	110	31	38	73	88	40	55				38	45.97
12-Apr-11	110	29	150	180	90	40	100	27	37	71	130	44	54	25	220	46	33	46.36
16-Aug-11	110	34	230	210	100	42	110	31	39	73	120	38	51	17	150	57	33	45.56
16-Mar-12	120	33	200	190	100	42	60	30	36	71	95	40	49	16	66	46	29	44
28-Aug-12	110	33	210	220	110	42	110	32	37	82	110	41	51	14	130	53	33	44
05-Mar-13	120	34	230	220	100	42	62	26	29	80	110	39	49	16	99	43	32	44
11-Sep-13	110	33	200	210	98	48	120	31	38	75	110	50	56	8.9	54	33	28	58
Chloride (mg/L)																		
Sample Date	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-11	MW-12	MW-15	MW-16	MW-17	MW-18	MW-19	MW-20	TL
26-Oct-06					190													19.4
23-Apr-07	179	25	72.1	165	176	19.5	151	12.4	57.7	147	41.1							19.4
04-Dec-07	228																	19.6
25-Nov-08	175	19.8	55.3	146	168	10.9	297	11.5	27.5	140	48.4							20
08-Apr-09	230	14.9	57.6	126	214	10.1	27.2	10.9	35.8	173	69.6							18.5
17-Dec-09	200	18	58	140	210	11	250	12	34	170	79							32
15-Apr-10	200	20	56	130	220	13	4	13	38	180	88	24	32				52	32
17-Aug-10	190	17	55	130	210	12	260	12	35	180	100	19	28				11	32
12-Apr-11	200	20	56	140	220	12	310	12	43	180	91	24	28	37	52	27	9.8	32
16-Aug-11	200	23	64	140	110	11	250	11	40	180	130	18	26	20	35	28	9.6	32
16-Mar-12	210	19	60	120	210	13	97	13	28	170	130	20	27	16	21	26	11	32
28-Aug-12	220	18	51	110	82	11	220	12	30	150	120	19	23	14	15	23	9.7	200
05-Mar-13	200	16	67	210	110	11	110	12	31	140	120	17	24	15	14	20	8.9	200
11-Sep-13	230	20	56	120	250	12	250	13	35	180	130	19	26	7.4	10	23	10	27

Table B2. General Minerals in Groundwater - 2006 through 2013
Closed Lincoln Landfill

Nitrate as Nitrogen (mg/L)																		
Sample Date	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-11	MW-12	MW-15	MW-16	MW-17	MW-18	MW-19	MW-20	TL
26-Oct-06					15													1.8
23-Apr-07	20	1.9	0.45	74	26	1.6	6.5	1.5	7.7	5.4	7.9							2.1
04-Dec-07	11																	2
25-Nov-08	11.8	2.58	1.13	13	7.16	0.68	5.22	1.27	3.08	1.93	7.59							2.1
08-Apr-09	11.4	2.72	1.62	28.8	10.7	0.68	0.24	0.88	2.03	1.14	9.09							1.95
17-Dec-09	9.2	3.7	1.2	15	7	0.8	5.1	1.3	0.81	0.53	10							5.3
15-Apr-10	11	4.1	0.89	15	7.6	0.83	0	1.2	0.65	0.66	11	0.92	1				0.82	5.3
17-Aug-10	14	3.6	0.55	27	9.7	0.72	4.7	0.74	3.8	1.2	11	0.92	0.95				1.3	5.3
12-Apr-11	20	4.5	1	33	11	0.74	2.5	0.71	6.2	0.51	14	0.74	0.83				0.8	5.3
16-Aug-11	19	5	1.1	49	14	0.6	5.6	0	3.8	1.5	12	0.89	1				0.99	5.3
16-Mar-12	20	3.4	1.5	42	12	0.69	0	0.72	1.7	0.98	8.6	0.95	1.1				1.1	5.3
28-Aug-12	11	2.9	1.5	49	11	0.59	7.8	0.97	0.95	1	9.2	0.89	0.97				1.1	5.3
05-Mar-13	18	2.5	1.6	13	13	0.68	4.2	1.2	3.6	1.2	8.9	0.91	1				1.3	5.3
11-Sep-13	14	3.5	1.7	56	7.5	0.76	11	1.5	5.1	1.1	10	0.99	1.2		0.11	0.7	1.6	5.5
Sulfate (mg/L)																		
Sample Date	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-11	MW-12	MW-15	MW-16	MW-17	MW-18	MW-19	MW-20	TL
26-Oct-06					836													32
23-Apr-07	829	25.8	524	1390	904	70.4	735	23.9	52.6	353	175							32
04-Dec-07	922																	31
25-Nov-08	730	24.7	738	727	824	23.3	721	21.9	31.9	410	204							30.9
08-Apr-09	890	21.8	633	1140	822	21.8	118	19.4	31	480	121							28.5
17-Dec-09	710	32	700	1000	740	25	930	23	34	460	240							31.43
15-Apr-10	710	40	680	920	720	26	23	23	35	450	300	31	67				32	31.93
17-Aug-10	760	35	760	1200	740	26	960	23	34	430	340	31	66				22	32.68
12-Apr-11	1000	38	810	1200	830	28	1100	22	39	450	450	36	60	35	30	31	21	36.24
16-Aug-11	970	40	880	1300	410	26	880	24	41	390	580	30	65	13	18	39	22	40
16-Mar-12	1000	38	920	1400	880	27	420	23	31	390	620	31	55	12	8	36	22	40
28-Aug-12	770	33	800	1300	770	25	850	22	31	410	680	30	57	9.4	19	27	20	40
05-Mar-13	800	29	700	1200	740	27	460	22	33	440	700	29	58	9.7	15	25	21	40
11-Sep-13	870	28	820	1500	810	28	1000	24	36	460	730	31	63	5.5	8.7	24	22	45

Table B2. General Minerals in Groundwater - 2006 through 2013
Closed Lincoln Landfill

Sample Date	Total Alkalinity (mg/L)																	TL
	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-11	MW-12	MW-15	MW-16	MW-17	MW-18	MW-19	MW-20	
26-Oct-06					532													390
23-Apr-07	539	229	561	406	528	296	414	207	227	304	304							376
04-Dec-07	579																	369
08-Dec-08	569	220	578	482	544	279	464	215	221	340	282							363.7
17-Dec-09	610	230	570	520	600	300	490	220	260	370	290							362.9
15-Apr-10	550	210	580	500	550	280	64	210	240	340	290	220	260				200	360
17-Aug-10	570	210	600	500	550	290	440	200	230	310	220	240	220				220	360
12-Apr-11	500	230	590	450	550	310	450	210	240	340	400	230	250	150	490	83	210	360
16-Aug-11	550	230	680	390	580	300	440	220	250	330	380	210	230	140	740	94	230	360
16-Mar-12	530	240	660	450	580	320	210	240	240	340	390	230	240	100	380	100	230	360
28-Aug-12	570	220	510	440	590	300	470	220	240	340	400	230	230	110	750	150	220	360
05-Mar-13	530	210	560	460	600	300	310	210	240	380	450	220	220	110	580	160	190	360
11-Sep-13	560	210	640	470	600	290	480	210	240	380	450	220	220	69	380	180	220	400

mg/L = milligram per liter

TL = tolerance limit

(a) The table was generated from data obtained from Geotracker (<http://geotracker.waterboards.ca.gov>) on January 2, 2014.

(b) Tolerance Limits were obtained from Semi-Annual and Annual Groundwater Monitoring Reports for first half 2006 through first half 2013 prepared by Applied Engineering and Geology, Inc.

(c) Data from September 11, 2013 is unpublished data from Cardno ATC.

(d) Blank entries indicate that the analyte was not detected at a concentration greater than the method detection limit.

(e) Concentrations shown in **bold** text exceed the Tolerance Limit for that monitoring event.

Table B3. Summary of Detected VOCs and SVOCs in Groundwater - 2006 through 2013
Closed Lincoln Landfill

Sample ID	Sample Date	EPA Method	Analyte	Result (µg/L)	Data Flags	Reporting Limit (µg/L)	Method Detection Limit (µg/L)
MW-1	23-Apr-07	8260B	Toluene	0.4	J	0.5	0.1
	23-Apr-07	8260B	Carbon disulfide	0.6		0.5	0.1
	23-Apr-07	8260B	Styrene	0.6		0.5	0.3
	16-Mar-12	8260B	cis-1,2-Dichloroethene	4.8		0.5	0.15
	16-Mar-12	8260B	Tetrachloroethene	12		0.5	0.13
	16-Mar-12	8260B	Trichloroethene	2		0.5	0.064
MW-2	08-Apr-09	8270C	bis-(2-Ethylhexyl)phthalate	11.2		2	1.3
MW-3	08-Apr-09	8270C	bis-(2-Ethylhexyl)phthalate	2		2	1.3
MW-4	08-Apr-09	8270C	bis-(2-Ethylhexyl)phthalate	42.1		2	1.3
MW-5	26-Oct-06	8260B	Toluene	0.5		0.5	0.1
	23-Apr-07	8260B	Toluene	0.9		0.5	0.1
	08-Apr-09	8270C	bis-(2-Ethylhexyl)phthalate	3.7		2	1.3
	15-Apr-10	8260B	Acetone	18		10	4.5
	17-Aug-10	8260B	Acetone	1	J	10	1
	17-Aug-10	8260B	Toluene	0.58		0.5	0.11
MW-6	08-Apr-09	8270C	bis-(2-Ethylhexyl)phthalate	3.7		2	1.3
	23-Apr-07	8260B	Toluene	0.5		0.5	0.1
MW-7	12-Apr-11	8260B	Toluene	1.1		0.5	0.11
MW-8	23-Apr-07	8260B	Toluene	12.8		0.5	0.1
	23-Apr-07	8260B	Styrene	0.4	J	0.5	0.3
	24-Nov-08	8260B	Toluene	0.3	J	0.5	0.1
	17-Aug-10	8260B	Acetone	5	J	10	1
	17-Aug-10	8260B	Toluene	0.76		0.5	0.11
	12-Apr-11	8260B	Toluene	1.5		0.5	0.11
MW-11	11-Sep-13	8260B	cis-1,2-Dichloroethene	0.33	J	0.5	0.15
MW-12	23-Apr-07	8260B	Toluene	5.6		0.5	0.1
	24-Nov-08	8260B	Toluene	1.7		0.5	0.1
MW-17	12-Apr-11	8260B	Acetone	19		10	1
	12-Apr-11	8260B	Toluene	2.4		0.5	0.11
MW-18	08-Apr-09	8270C	bis-(2-Ethylhexyl)phthalate	2		10	1.4
	12-Apr-11	8260B	Toluene	1.4		0.5	0.11
	16-Aug-11	8260B	Toluene	1.4		0.5	0.11
	16-Mar-12	8260B	Toluene	1		0.5	0.11
	28-Aug-12	8260B	Toluene	0.3	J	0.5	0.11

J= Estimated concentration between the RL and MDL.

µg/L = microgram per liter

ANNEX A

Previous Investigation Data

SEMI-ANNUAL MONITORING REPORT FIRST HALF 2013

SITE:

CLOSED LINCOLN LANDFILL (CIP 349)

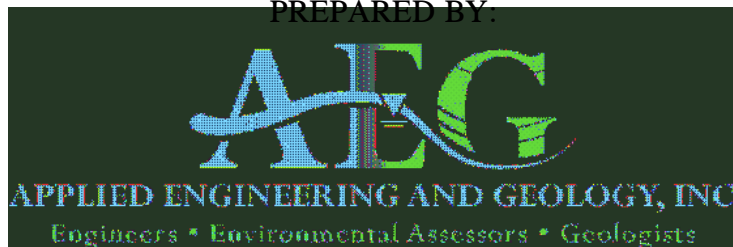
VIRGINIATOWN ROAD
LINCOLN, PLACER COUNTY, CALIFORNIA 95648

PREPARED FOR:

MR. WES HEATHCOCK, SOLID WASTE SUPERVISOR CITY OF LINCOLN

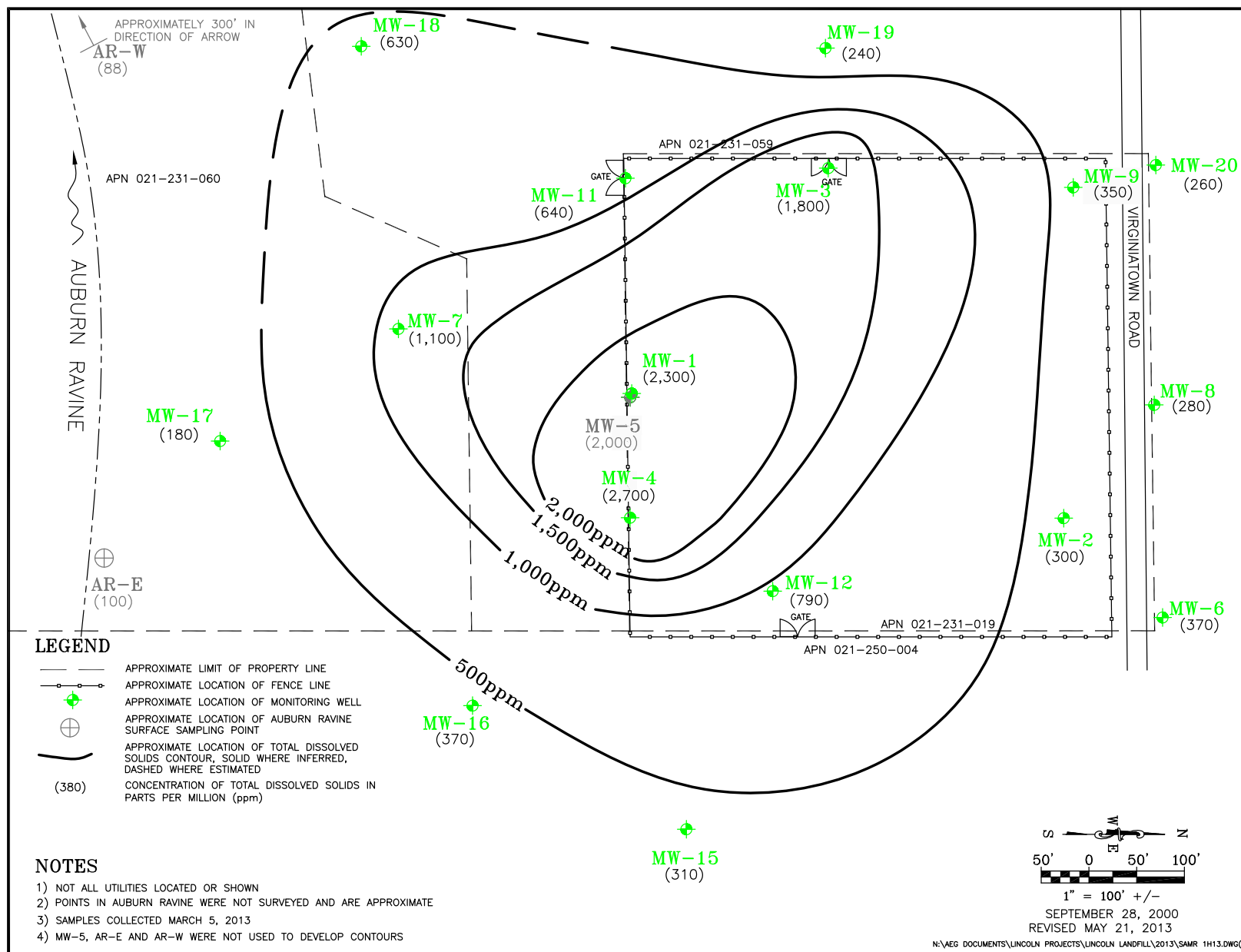
600 SIXTH STREET
LINCOLN, CALIFORNIA 95648

PREPARED BY:



P.O. BOX 247 • 578 E STREET
LINCOLN, CALIFORNIA 95648

OFFICE (916) 645-6014 • FAX (916) 645-6098 • EMAIL aeg@aegEngineers.com



TOTAL DISSOLVED SOLIDS ISOCONCENTRATION CONTOURS

CLOSED LINCOLN LANDFILL
LINCOLN, PLACER COUNTY, CALIFORNIA

APPROVED	DATE

FIGURE G1



APPLIED ENGINEERING AND GEOLOGY, INC.
Engineers • Environmental Assessors • Geologists
P.O. BOX 247 LINCOLN, CA 95848
P: (916) 645.6014 aegEngineers.com

P.O. BOX 247 LINCOLN, CA 95648
P: (916) 645.6014 aegEngineers.com

REPORT OF THE CORRECTIVE ACTION PLAN (CAP) AND ENGINEERING FEASIBILITY STUDY

SITE:

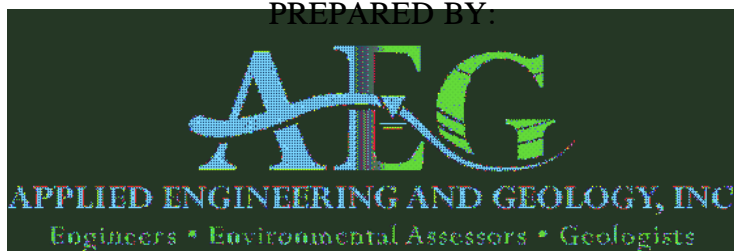
CLOSED LINCOLN LANDFILL (CIP 349)

VIRGINIATOWN ROAD
LINCOLN, PLACER COUNTY, CALIFORNIA 95648

PREPARED FOR:

CITY OF LINCOLN
600 SIXTH STREET
LINCOLN, CALIFORNIA 95648

PREPARED BY:



P.O. BOX 247 • 578 E STREET
LINCOLN, CALIFORNIA 95648

OFFICE (916) 645-6014 • FAX (916) 645-6098 • EMAIL aeg@aegEngineers.com

MAY 3, 2013

TABLE 5-11

Analytical Results of Geoprobe® Soil Vapor Samples Collected June 2004
Analyzed by Modified Method TO-15 for VOCs (in ppbV) and by Modified ASTM D-1945 for Methane (in percent of total)
Only Select Analytes are Shown

Borehole	Freon 12	Chloro	PCE	Benzene	Toluene	VC	MC	Freon 114	2-Propanol	Methane
GP-1	<5.0	<5.0	<5.0	<5.0	<5.0 ¹	<5.0	14	<5.0	52	0.00013
GP-2	<5.0	<5.0	7.4	<5.0	<5.0	<5.0	12	<5.0	35	<0.00010
GP-3	<5.0	26	<5.0	<5.0	<5.0	<5.0	14	<5.0	36	0.013
GP-4	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	8.7	<5.0	27	<0.00010
GP-5	16	<5.0	7.9	<5.0	<5.0	<5.0	7.6	<5.0	22	0.00010
GP-6	<5.0	<5.0	11	<5.0	<5.0	<5.0	8.0	<5.0	22	<0.00010
GP-7	12	<5.0	<5.0	5.0	6.1	<5.0	6.7	5.1	23	0.00016
GP-8	5.2	<5.0	<5.0	<5.0	9.4	<5.0	9.2	<5.0	31	0.00037
GP-9	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	7.0	<5.0	26	0.00022
GP-10 ALT	30	<5.0	<5.0	<5.0	<5.0	<5.0	10	33	36	0.090
GP-11	<5.0	<5.0	11	<5.0	<5.0	<5.0	<5.0	5.3	<5.0	<0.00010
GP-12	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<0.00010
GP-13	<5.0	<5.0	18	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	0.00020
GP-14	6.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<0.00010
GP-15	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<0.00010
GP-16	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	8.3	<5.0	42	<0.00010
GP-17	<5.0	<5.0	10	<5.0	<5.0	<5.0	6.2	<5.0	29	0.00026
GP-18	<5.0	<5.0	<5.0	<5.0	5.6	<5.0	8.2	<5.0	24	0.00021
GP-19	6.3	<5.0	<5.0	<5.0	5.0	17	6.7	<5.0	26	0.087

TABLE 5-11

Analytical Results of Geoprobe® Soil Vapor Samples Collected June 2004
Analyzed by Modified Method TO-15 for VOCs (in ppbV) and by Modified ASTM D-1945 for Methane (in percent of total)
Only Select Analytes are Shown

Borehole	Freon 12	Chloro	PCE	Benzene	Toluene	VC	MC	Freon 114	2-Propanol	Methane
GP-21	<5.0	<5.0	9.3	<5.0	<5.0	<5.0	7.1	<5.0	31	<0.00010
GP-23	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.5	<5.0	23	0.00026
GP-24	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	6.8	<5.0	33	0.00011
GP-25	22	<5.0	<5.0	<5.0	<5.0	<5.0	6.9	17	41	<0.00010
GP-26	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	6.4	<5.0	31	0.00020

Chloro = Chloroform

PCE = Tetrachloroethene

VC = Vinyl Chloride

MC = Methylene Chloride

¹ Toluene was detected at a concentration of 5.6 ppbV in sample GP-1 Duplicate.

APPENDIX C

Monitoring Well Installation Work Plan

C1 DRILLING AND WELL CONSTRUCTION

C1.1 PERMITTING

Prior to beginning the drilling and piezometer installation, the contractor will obtain drilling/well permits from Placer County Department of Environmental Health (PCDEH) and the City of Lincoln. The monitoring well location will be marked in white paint and notification made to the Underground Service Alert prior to the commencement of drilling or excavation activities. The City of Lincoln is responsible for marking and locating underground utilities located on-site. Additionally, the PCDEH will be notified at least 72 hours in advance of well grouting activities.

C1.2 HOLLOW STEM AUGER DRILLING

One borehole will be drilled with a hollow stem auger drill rig equipped with 18-inch diameter augers for drilling through the waste mass and into the top 2 feet of native soil beneath the waste. The waste material is expected to be approximately 5 feet deep based on the depth to bottom of waste previously documented in boreholes GP-10 and GP-11 (AEG, 2013). Upon encountering the native soil beneath the waste, drilling will stop and a 10-inch diameter conductor casing will be installed to seal off the waste. Soil cuttings and waste materials will travel up the annulus of the borehole, discharge to the ground surface, and be temporarily stored on site in a roll off bin or 55-gallon drums pending waste profiling and off site disposal.

Hollow stem auger drilling will recommence following a minimum of 48 hours after installing the conductor casing. The drill rig will be equipped with 8-inch diameter augers and drilling will continue down through the base of the conductor casing to the total depth. Soil cuttings and groundwater will travel up the annulus of the borehole and the conductor casing, discharge to the ground surface, and be temporarily stored on site in a roll off bin or 55-gallon drums pending waste profiling and off site disposal. Piezometers will be constructed inside the augers. The annulus between the piezometer casing and auger will act as a tremie for filter pack sand, bentonite, and grout.

Following the completion of drilling, the borehole will be converted to 2-inch diameter PVC cased groundwater monitoring well.

Soil sampling will be conducted on 5-foot intervals in the boring down to the total depth drilled. Samples will be inspected for the presence of waste material and lithology. The contact between the waste and underlying native material will be identified by the field geologist to determine the exact depth for the conductor casing. The samples will be logged by H&K's field geologist and documented on the boring log provided in Annex A.

C1.3 WELL CONSTRUCTION

Proposed construction details and rationale are presented below.

Well ID	Total Depths (feet bgs)	Screened Interval (feet bgs)	Rationale
MW-21	35	Minimum depth 25 – 35	Estimated surface elevation at the proposed location is 212 feet msl. Compliance elevation is 184.6. Approximate depth to compliance elevation is 27 feet bgs.

bgs = below ground surface
ID = identification

The groundwater monitoring well shall be constructed of 2-inch-diameter, Schedule 40 polyvinyl chloride (PVC) casing and 0.020-inch slotted PVC screen. Lonestar No. 3 (or equivalent) sand filter pack shall be used for each screen interval and will be placed to an elevation of 2 feet above the top of the well screen. After placement of the filter pack, the subcontractor shall surge the screen interval until the filter pack has sufficiently settled, as determined by an H&K geologist. After placement of the sand filter pack, a minimum 2-foot-thick bentonite seal will be installed to preclude grout penetration into the filter pack and screened section.

Grout placement for shall be accomplished by pumping a neat cement mixture of Type II Portland cement with 3 pounds of powdered nonbeneficiated bentonite and 7 gallons of water per 94-pound sack of cement. Grout shall be pumped through a 1- or 2-inch diameter tremie pipe placed inside the auger flights. No more than 10 feet of casing shall be recovered in any one recovery. Every effort shall be made to keep grout from falling below the bottom of the auger at any point during grouting operation. Grout will be pumped to a level flush with the existing grade. The Surface completion for the well will be an above ground lockable well box.

C1.4 MONITORING WELL CONSTRUCTION DOCUMENTATION

The field geologist, upon completion of the well, will document the construction using the Well Construction Diagram, included in Annex A. The field geologist will prepare well construction detail graphics for the well that will include the following information:

- Borehole diameter and depth.
- Well casing diameter, material type and well caps
- Screen interval length and depths, and screen slot size.
- Bentonite clay seal interval lengths and depth.
- Sand pack grain size, interval lengths and depth.

- Surface seal depth, material type, security locking top, and surface finish.

C1.5 SURVEY

Following the completion of the piezometer installation activities, a horizontal and vertical survey shall be performed for the new well casing and ground surface. The well is required to be measured vertically to within 0.01 feet relative to msl, and horizontally to an accuracy of 0.5 feet in reference to the nearest National Geodetic Survey benchmark. The well survey data will conform to the requirements of the State Water Resources Control Board GeoTracker database.

The elevations of the top of the casings shall be used to calculate groundwater elevations.

C1.6 REPORTING

Following completion of the well installation, H&K will prepare a Field Summary Report to document the field work. The technical report will describe the underlying geology, well construction procedures, and details. The FSR will be approved for release by a California Certified Hydrogeologist/Professional Geologist or Professional Engineer.

C2 QUALITY ASSURANCE PLAN

The purpose of the following QAP is to specify procedures to be followed to maintain consistent quality of field and laboratory data.

C2.1 SPECIAL TRAINING/CERTIFICATIONS

Personnel working on the project Site shall be certified under OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910). The analytical laboratory will be California certified. A site specific health and safety plan shall be prepared and implemented during construction of the monitoring well.

C2.2 PREPARATORY ACTIVITIES

The following preparatory activities are to be performed prior to the sampling event: Chain of custody documentation and sample labels are to be completed to the extent feasible (such as date, sampler names, site identification and sample identification) prior to field activities, especially during wet conditions.

C2.3 EQUIPMENT AND SUPPLIES

Appropriate sampling equipment and supplies include:

Gloves	Boots
Hard hat	Safety glasses
First aid and safety equipment	Field data sheets and/or notebook
Sample labels and custody forms	Paper towels
Sample containers	Tape measure
Wash bottle	GPS
Coolers	Waste container
Wipes	Extra batteries
Camera	

C2.4 DOCUMENTATION AND RECORDS

The project manager will distribute the work plan to the project staff. Project staff are to review the pertinent sections of the work plan prior to performing the relevant tasks. Chain-of-custody documentation, field maps and photographs will be maintained for a period of five years following the investigation. Location maps, sample collection methodology and quality control procedures, laboratory reports and chain-of-custody documentation will be included in a summary report.

Field Documentation. Sampling activities are to be documented in a data sheet or notebook using indelible ink. If any changes are made to the record, the original

notation will be crossed out with a single line and initialed. The following observations are to be recorded:

- Sample identification number and location;
- Date and time of sampling;
- Persons performing sampling;
- Unusual sample conditions; and
- Field or sample conditions that may affect the sample quality.

Photographs are to be taken of each sample location, and the sample locations are to be recorded on a map, such as an aerial site photograph.

Sample Custody Documentation. Each sample will be properly documented to ensure timely, correct, and complete analysis for all parameters requested. The appropriate documentation includes sample labels, custody seals, and chain-of-custody records. The chain-of-custody forms will contain the following information:

- Sample number,
- Project name/number,
- Sampling date,
- Sampling time,
- Sampler's name,
- Preservatives used,
- Analyses requested,
- Sample destination and,
- Special handling requirements.

Forms will be filled out with indelible ink. Sample numbers and the identity of field duplicates and travel blanks will be recorded in the field notebook.

Chain-of-Custody. Clear chain-of-custody of samples shall be maintained and documented from the time of sample collection until completion of the analyses. When collected, each sample will be considered to be in the sampler's custody, and the sampler will be responsible for the care and custody of the samples until they are dispatched. When transferring samples, the individuals relinquishing and receiving will sign, date, and note the time on the Chain-of-Custody Record. This document records sample custody transfers.

C2.5 DECONTAMINATION

Decontamination of field sampling equipment will be conducted prior to and following use that may encounter potentially contaminated soil, waste, soil gas, sludge, surface water and groundwater. The purpose is to reduce the possibility of cross-contaminating samples, which are to undergo physical and/or chemical analyses, or other media, which must remain free of contamination.

Light equipment, such as hand tools, will be scrubbed with clean water and a detergent in a bucket, rinsed with clean water, rinsed with deionized water, and allowed to air dry.

Heavy equipment, including trucks and subsurface sampling and drilling equipment will be cleaned using a high pressure washer prior to site entry, between boreholes, and upon completion of drilling activities at the site.

Surface and subsurface sampling equipment, including sampling trowels, hand-core punch, hollow-stem augers, brass sleeves, and split-spoon sampling tubes, will be decontaminated prior to sampling and between each sampling event. These will be cleaned with a soft bristled brush to remove gross material, washed with clean tap water and a detergent, rinsed with deionized water and allowed to air dry.

C2.6 INVESTIGATION DERIVED WASTE

Waste materials will consist of soil cuttings and decontamination water generated during the site investigation. The soil cutting will be considered nonhazardous and spread onsite. The decontamination water will be stored onsite in 55-gallon drums pending offsite transport and disposal at an appropriately permitted facility.

ANNEX A

FIELD FORMS

EXPLORATORY BORING LOG

 8 SEVILLE CT, SUITE 100, CHICO, CA 95928
 PHONE 530-894-2487, FA 530-894-2437

Boring No.
MW-21
Project Name: CLOSED LINCOLN LANDFILL

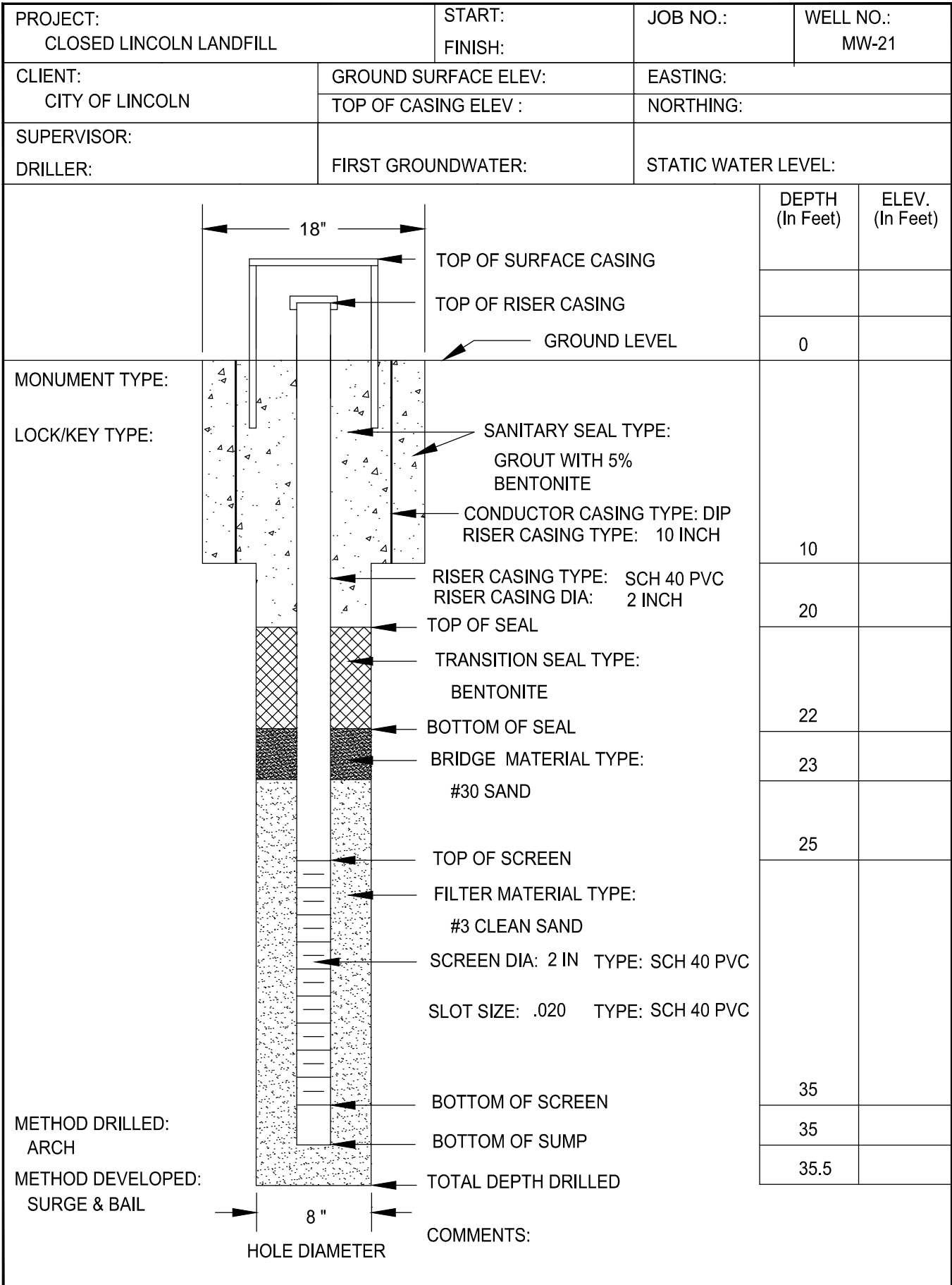
Project No.:
Task:
Date Start:
Location: VIRGINIATOWN ROAD, LINCOLN, CA

Ground Elev. (Ft. AMSL):
Date Finish:
Sheet: Of
Logged By:
Drilling Cmpny:
Drill Rig Type:
Driller:
Drilling Method:
Hammer Type:
Boring Dia. (In.):
Total Depth (Ft.):
Backfill or Well Casing:

24 Hour Clock Time (HH:MM)	Pocket Penetrometer (TSF)	Uncorrected Blow Counts (Blows / 6-inch)	Drilling Method and/or Sampler Type	Sample Recovery (Ft./Ft.)	Sample No.	Depth B.C.S. (Ft.)	Sample Interval And Symbol	Well Construction Detail	Graphic Log	Ground Water Information			
										Date			
										Time (24 Hour)			
										Depth (Ft.)			
										Soil and/or Rock Descriptions			
<small>SOIL: USCS Symbol; Name; Particle Size Gradation %; Munsell Color; Density/Consistency; Moisture; Odor; Organics; Cementation; Texture; Refuse; Etc. ROCK: Unit Name; Rock Type; Lithology; Munsell Color; Bedding/Foliation; Weathering; Hardness; Fracture/Joint Spacing and Roughness; Moisture; RQD</small>													
						1							
						2							
						3							
						4							
						5							
						6							
						7							
						8							
						9							
						0							
						1							
						2							
						3							
						4							
						5							
						6							
						7							
						8							
						9							
						0							

NOTES:

MONITORING WELL CONSTRUCTION DIAGRAM



APPENDIX D

Construction Plans and Specifications



CONSTRUCTION DRAWINGS LINCOLN CLOSED LANDFILL PERIMETER TRENCH DEWATERING SYSTEM

CITY OF LINCOLN
DEPARTMENT OF PUBLIC SERVICES
600 SIXTH STREET, LINCOLN, CALIFORNIA, 95648

SHEET INDEX

- 1 TITLE SHEET
- 2 CONCEPTUAL LANDFILL DEWATERING PLAN AND ELEVATION VIEWS A AND B
- 3 SANITARY SEWER CONNECTION PLAN AND ELEVATION VIEW C
- 4 PERIMETER DEWATERING TRENCH PLAN VIEW
- 5 PERIMETER DEWATERING TRENCH ELEVATION VIEWS D AND E
- 6 PERIMETER DEWATERING TRENCH ELEVATION VIEWS F AND G
- 7 ONSITE CONVEYANCE PIPING, GRAVEL ACCESS ROAD, AND SECURITY FENCE
- 8 CITY OF LINCOLN 2004 IMPROVEMENT STANDARDS CONSTRUCTION DETAILS
- 9 H&K CONSTRUCTION DETAILS
- 10 H&K CONSTRUCTION NOTES

ACCEPTED FOR CONSTRUCTION

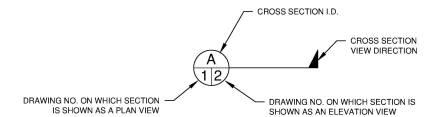
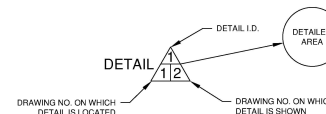
ORIGINAL SIGNED BY

JON CRAWFORD - INTERIM CITY ENGINEER
CITY OF LINCOLN
DEPARTMENT OF PUBLIC SERVICES

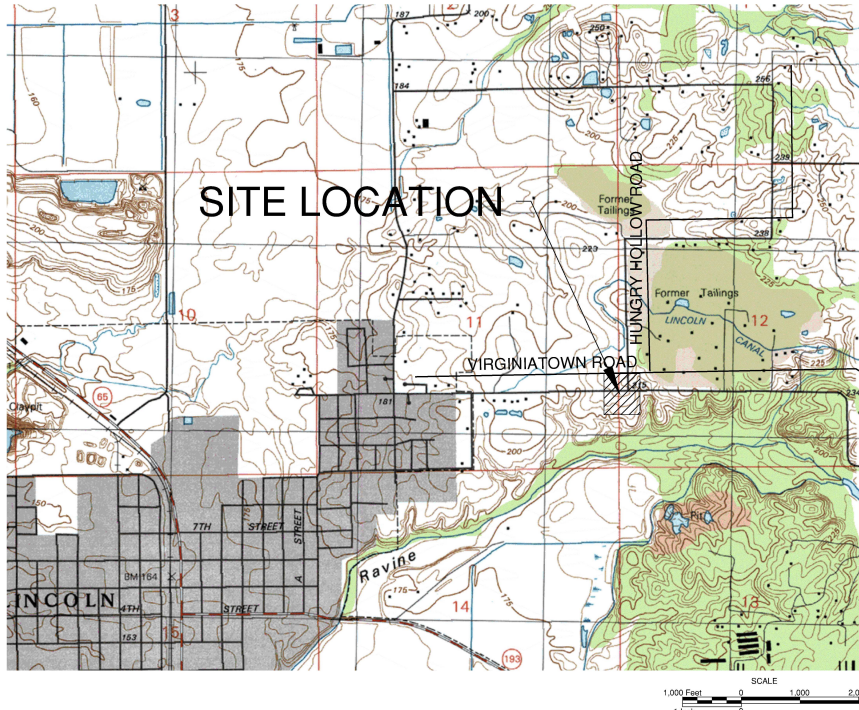
ENGINEERING DESIGN

Donald M. Olsen

DONALD M. OLSEN, P.E. 49514
HOLDREGE & KULL
PRINCIPAL



TYPICAL SECTION AND DETAIL NUMBERING SYSTEM



SITE LOCATION MAP
VIRGINIATOWN ROAD & HUNGRY HOLLOW ROAD
LINCOLN, PLACER COUNTY, CALIFORNIA

REVISIONS:	DATE:	DRAWN BY:	DWG	SHEET NO.
		CHECKED BY: <td>HJC</td> <td>1</td>	HJC	1
		PROJECT NO.:	70472A-01	
		DATE:	09-29-14	

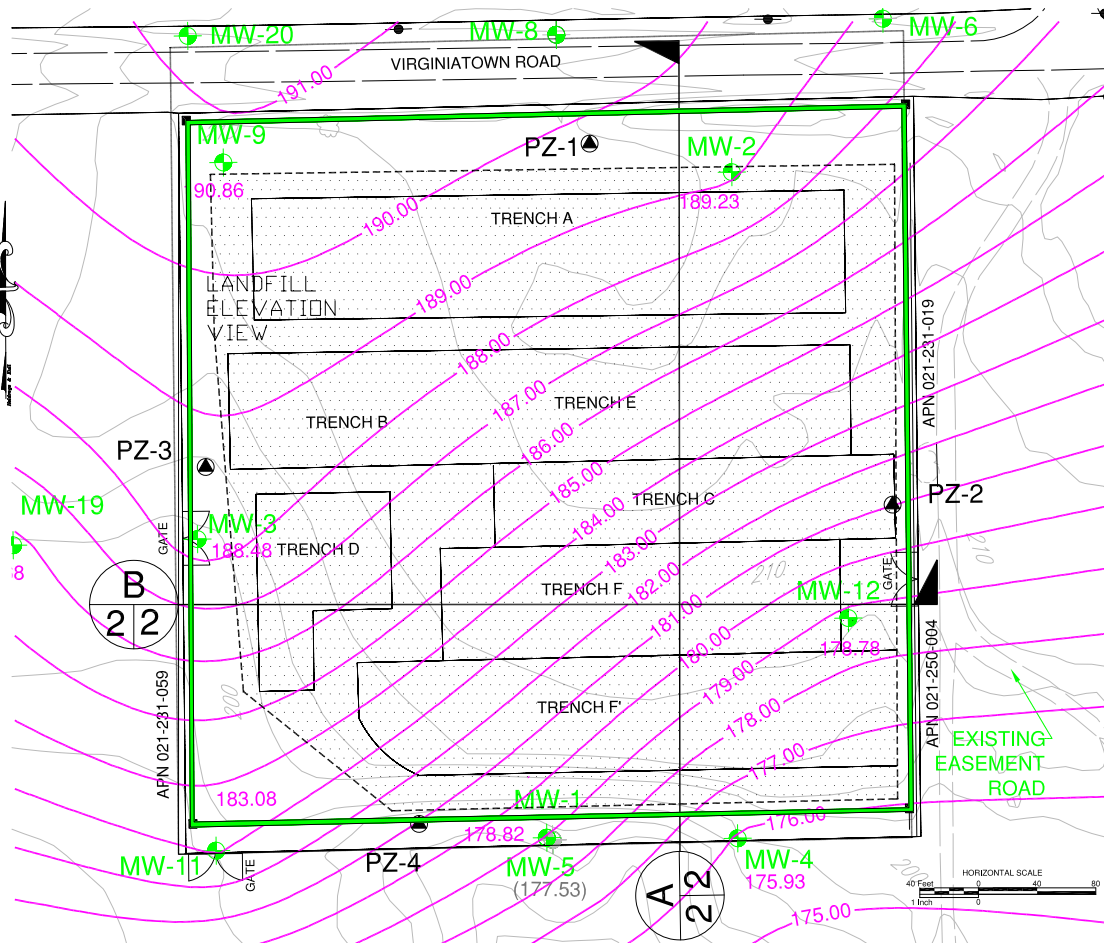
TITLE SHEET

CLOSED LINCOLN LANDFILL
Virginiatown Road & Hungry Hollow Road
Lincoln, Placer County, California



H&K HOLDREGE & KULL
Civil Engineers
1000
Chico, CA 95926
PH: 530-894-2487 FAX: 530-894-2437

70472A-01-14-0929_S01-1.DWG



LEGEND

- SURFACE WATER FLOW DIRECTION
- UTILITY POLE
- PROPERTY BOUNDARY
- FENCE LINE
- GROUNDWATER POTENTIOMETRIC SURFACE CONTOUR
DECEMBER 24, 2013, (INTERVAL = 1 FOOT)
- EXTENTS OF FORMER LANDFILL DISPOSAL AREA
- EXTENTS OF FORMER DISPOSAL TRENCHES
- MONITORING WELL
- PIEZOMETER
- CUTOFF TRENCH (NOT TO SCALE)

CROSS SECTION ALIGNMENT

CROSS SECTION I.D.

CROSS SECTION
VIEW DIRECTION

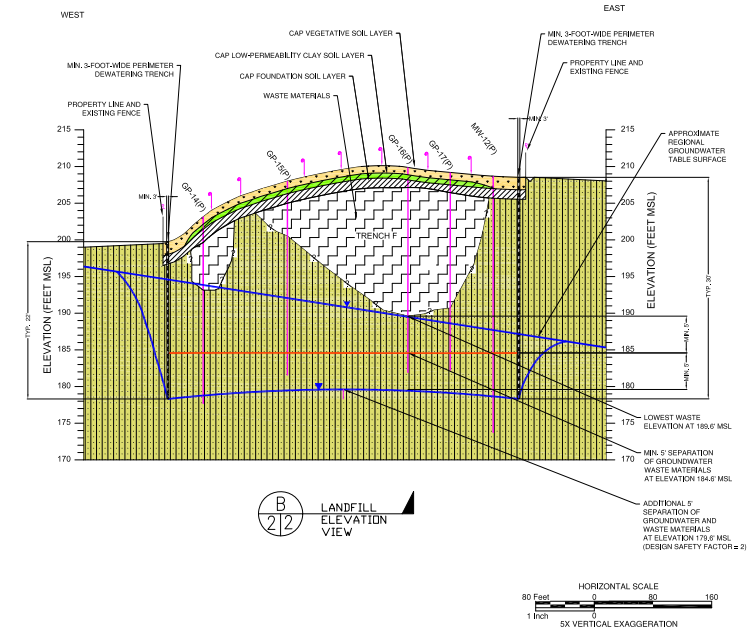
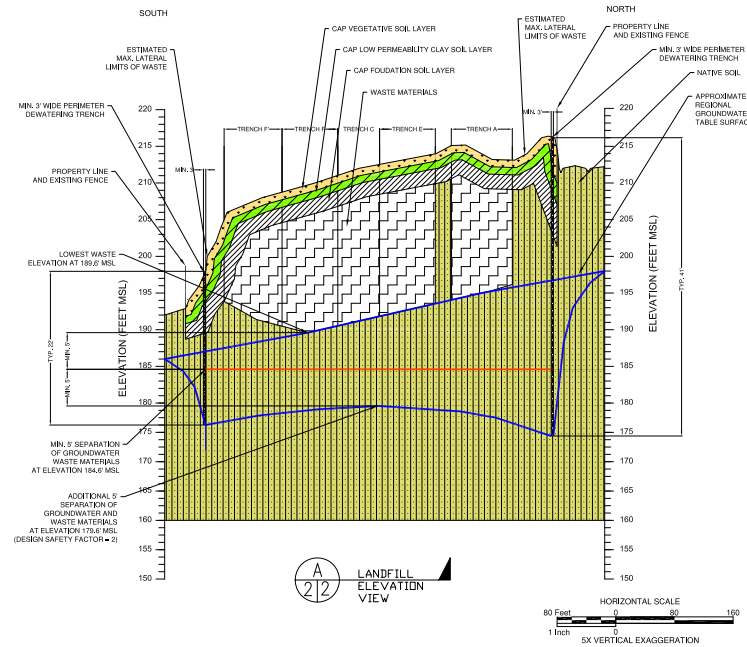
DRAWING NO. ON WHICH
SECTION IS SHOWN
AS A PLAN VIEW

DRAWING NO. ON WHICH
SECTION IS SHOWN
AS AN ELEVATION VIEW

- CAP VEGETATIVE SOIL LAYER
- CAP LOW-PERMEABILITY CLAY SOIL LAYER
- CAP FOUNDATION SOIL LAYER
- NATIVE SOIL
- MUNICIPAL SOLID WASTE

NOTES

- 1) SITE PLAN FEATURES ARE LOCATED APPROXIMATELY. FEATURES AND TOPOGRAPHIC BASE MAP FROM APPLIED ENGINEERING AND GEOLOGY, INC. TOPOGRAPHIC CONTOUR INTERVAL = 2 FEET. NOT ALL UTILITIES LOCATED OR SHOWN.
- 2) GROUNDWATER ELEVATION FROM MW-5 NOT USED TO DEVELOP POTENTIOMETRIC SURFACE CONTOURS.
- 3) DECEMBER 2013 GROUNDWATER ELEVATION DATA FROM ANNUAL MONITORING REPORT 2013, CARDNO ATC, JANUARY 29, 2014.



REVISIONS:	DATE:	DRAWN BY:	DWG	SHEET NO.
		CHECKED BY:	HJC	2
		PROJECT NO.:	70472A-01	
		DATE:	09-28-14	

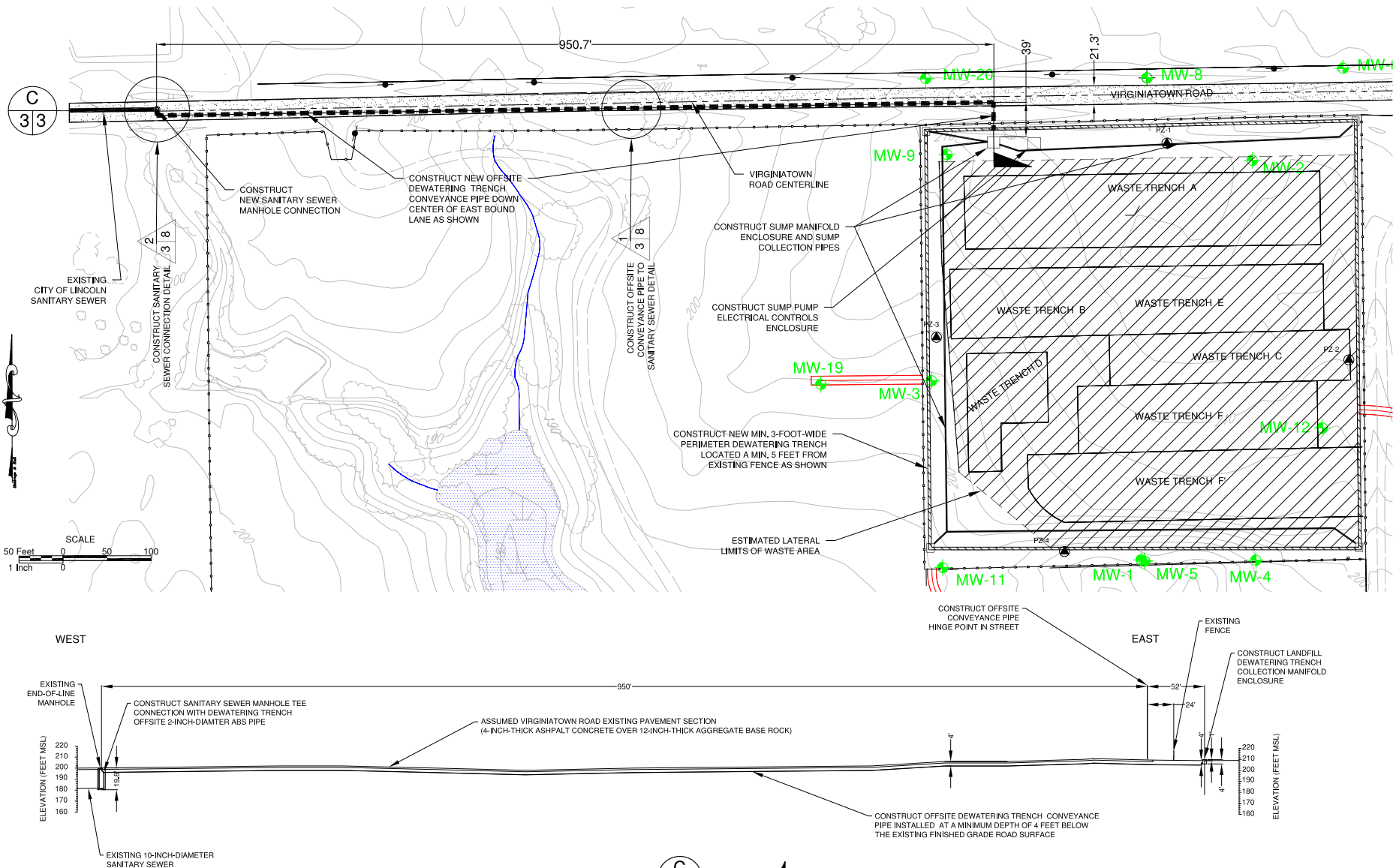
CONCEPTUAL TRENCH
PLAN AND CROSS-SECTION VIEWS

CLOSED LINCOLN LANDFILL
Virginia Town Road & Hungry Hollow Road
Lincoln, Placer County, California



HOLDREGE & KULL
ENGINEERS
8000 Grant Blvd., Suite 100
Oakland, CA 94628
PH: 510-864-2467 FAX: 510-864-2467

70472A-01_14-0928_SHT-2.DWG



- NOTES:
1. THE BASE MAP WAS PROVIDED BY THE CITY OF LINCOLN DEPARTMENT OF PUBLIC SERVICES (CLDPS).
 2. ALL FEATURES SHOWN ON THIS SHEET ARE APPROXIMATELY LOCATED WITHIN ± 5 FEET OF THE LOCATIONS SHOWN.
 3. THE LOCATIONS OF THE EXISTING 10-INCH-DIAMETER SANITARY SEWER AND END-OF-LINE MANHOLE SHOWN ON BOTH THE PLAN AND ELEVATION VIEWS WERE TAKEN FROM SHEETS 1, 2, 3, 12 AND 13 OF 19 SHEETS OF THE IMPROVEMENT PLANS FOR THE LINCOLN HIGHLANDS OFFSITE SEWER & WATER THAT WERE PREPARED BY BAKER-WILLIAMS ENGINEERING GROUP, DATED MARCH 1, 2006 WITH REVISIONS TO SHEETS 12 AND 13 (THE REVISION DATES WERE NOT DISCERNABLE ON THE PLANS PROVIDED BY CLDPS).

C
3/3
ELEVATION
VIEW

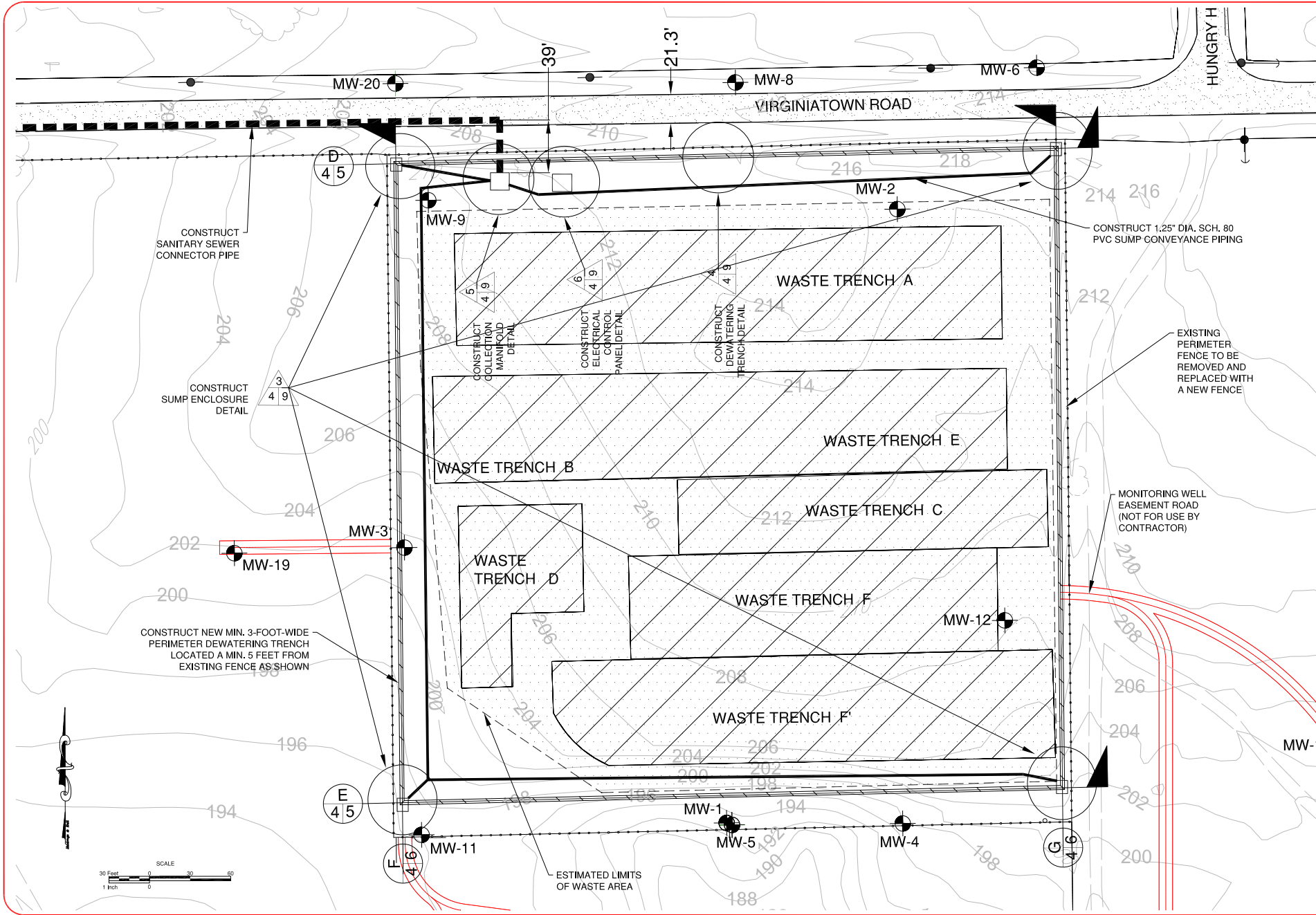
HORIZONTAL AND VERTICAL SCALES

40 Feet

1 Inch

HK HOLDREGE & KULL Environmental Engineers & Architects 8 Beale Court, Suite 100 Chico, CA 95928 PH: 530-894-2487 FAX: 530-894-2427	DATE: _____ REVISIONS: _____ DRAWN BY: DMO CHECKED BY: HUC PROJECT NO.: 70472A-01 DATE: 09-29-14	SHEET NO. 3 DMO-120415
	SANITARY SEWER CONNECTION PLAN VIEW AND ELEVATION VIEW C	

CLOSED LINCOLN LANDFILL
 Virginia Town Road & Hungry Hollow Road
 Lincoln, Placer County, California



REVISIONS:	DATE:	DRAWN BY:	DWG. NO.
CHECKED BY:	DATE:	CHECKED BY:	SHEET NO.
			4
PROJECT NO. 70472A-01			
DATE: 09-29-14			

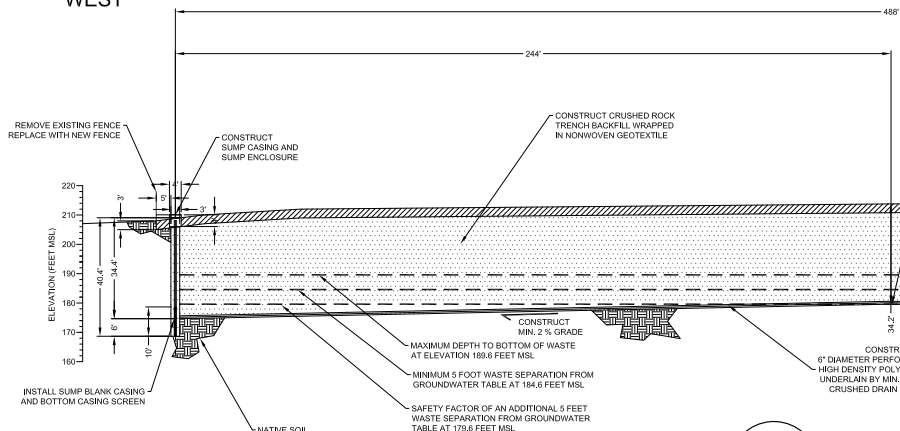
LANDFILL PERIMETER DEWATERING TRENCH PLAN VIEW

CLOSED LINCOLN LANDFILL
Virginia Town Road & Hungry Hollow Road
Lincoln, Placer County, California

HK HOLDREGE & KILL
Environmental Engineers & Scientists
8 Steele Court, Suite 100
Chico, CA 95928
PH: 530-894-2487 FAX: 530-894-2427

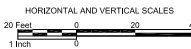
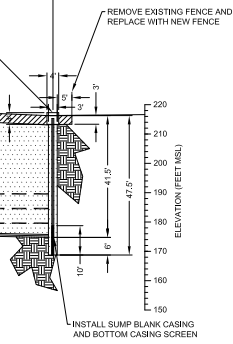
70472A-01_14-0923_SHT-1.DWG

D-F Intersection WEST

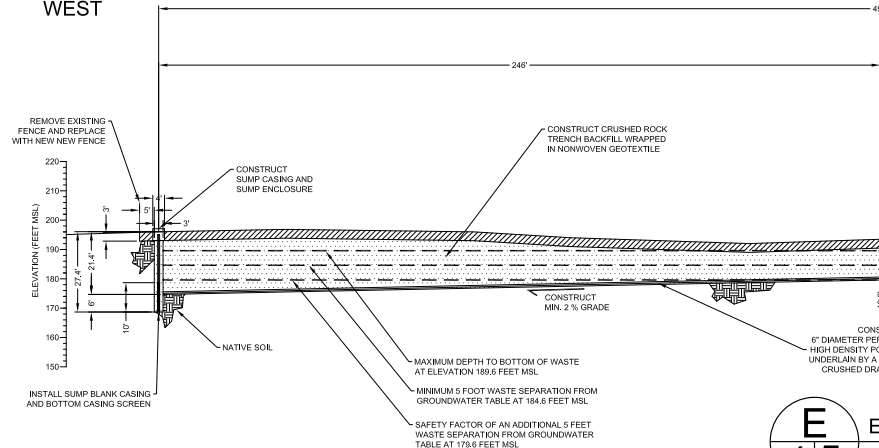


D 4/5 ELEVATION VIEW

D-G Intersection EAST

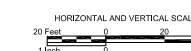
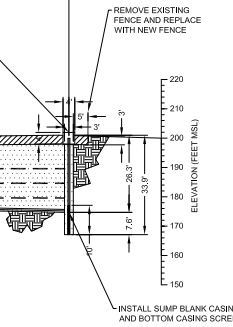


E-F Intersection WEST



E 4/5 ELEVATION VIEW

E-G Intersection EAST



DATE:	DRAWN BY:	DWG NO.	SHEET NO.
09-29-14	HJC	70472A-01	5
CHECKED BY:	PROJECT NO.	70472A-01	
	DATE:	09-29-14	

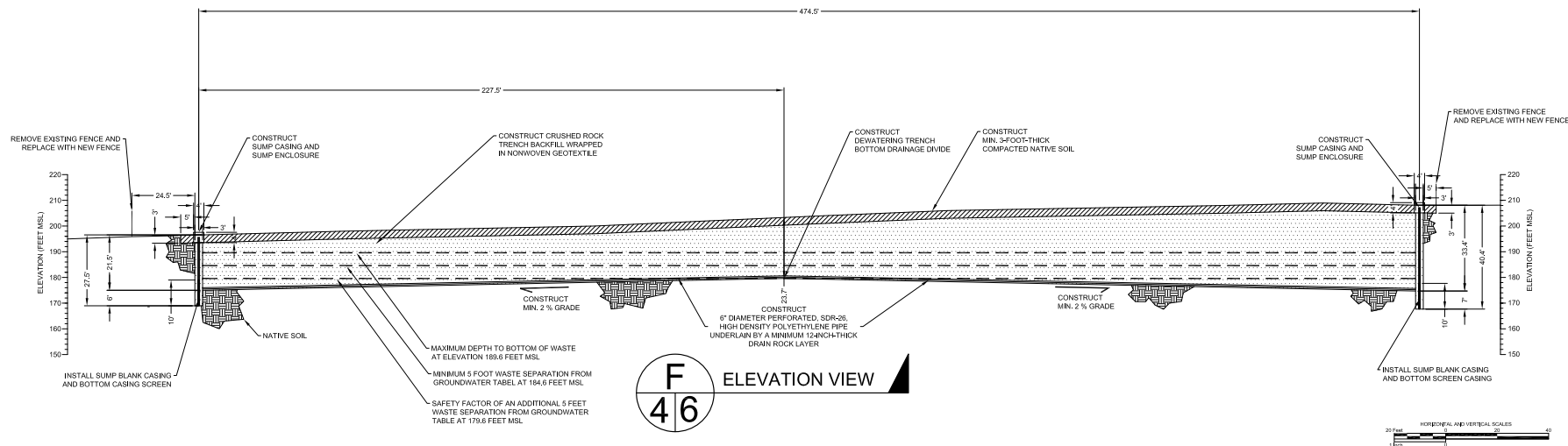
PERIMETER DEWATERING TRENCH
ELEVATION VIEWS

CLOSED LINCOLN LANDFILL
Virgatawn Road & Hungry Hollow Road
Lincoln, Placer County, California



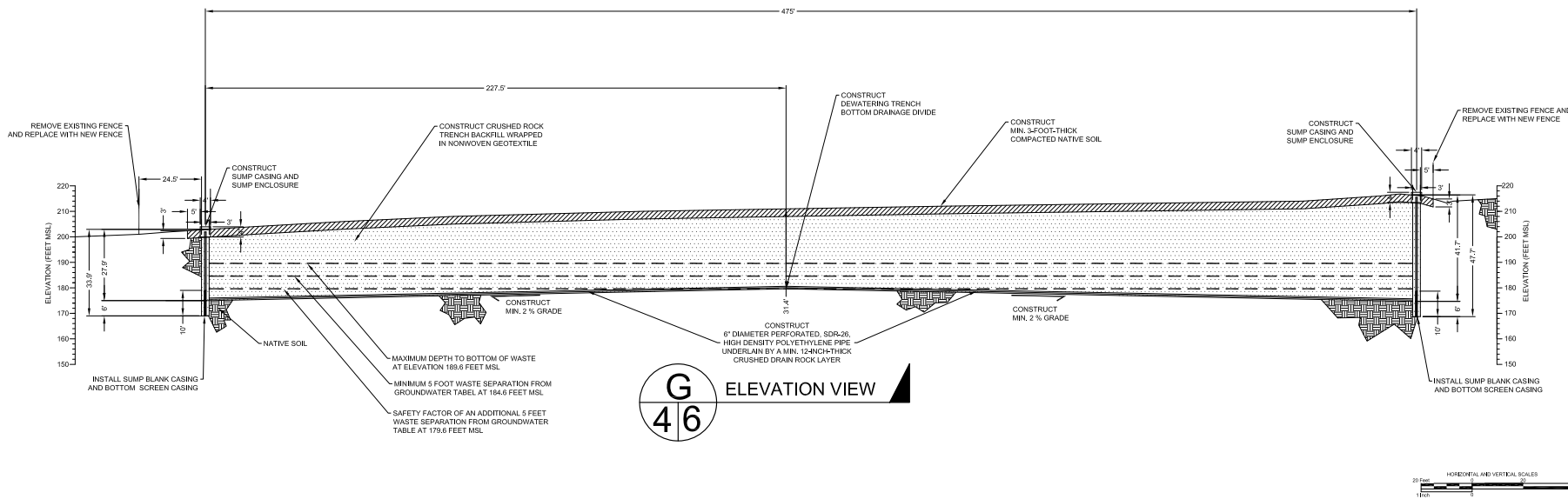
H. K. HOLDRIDGE & KULL
INCORPORATED
10000
PH: 916-486-2487 FAX: 916-486-2437

E-F
Intersection
SOUTH



D-F
Intersection
NORTH

E-G
Intersection
SOUTH



D-G
Intersection
NORTH

REVISIONS:	DATE:	DRAWN BY:	DWO
		CHECKED BY:	HJC
		PROJECT NO.	20472A-01
		DATE:	09-29-14


SHEET NO. 6

PERIMETER DEWATERING TRENCH
ELEVATION VIEWS

CLOSED LINCOLN LANDFILL
Virginitown Road & Hungry Hollow Road
Lincoln, Placer County, California



HK HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLACISTS
8 Seville Court, Suite 100
Chico, CA 95928
PH: 530-894-2487, FAX: 530-894-2437



City of Lincoln

CITY OF LINCOLN

DEPARTMENT OF PUBLIC WORKS

PUBLIC FACILITIES

IMPROVEMENT STANDARDS

June 2004

REVISIONS:

REVISIONS	DATE	APPROVED	BY
1. UPDATE	5/20/03	<i>[Signature]</i>	SS-1
2. UPDATE	5/15/04	<i>[Signature]</i>	SS-1

CITY OF LINCOLN
DEPARTMENT OF PUBLIC WORKS

SEWER TRENCH DETAIL

SCALE: NONE
DATE: AUGUST 1998
DRAWN BY: L.M.

SS-1

REVISIONS:

REVISIONS	DATE	APPROVED	BY
1. UPDATE	5/20/03	<i>[Signature]</i>	SS-6
2. UPDATE	5/15/04	<i>[Signature]</i>	SS-6

CITY OF LINCOLN
DEPARTMENT OF PUBLIC WORKS

CLEANOUT TO GRADE (SEWER CONNECTED TO "WYE")

SCALE: NONE
DATE: AUGUST 1998
DRAWN BY: L.M.

SS-6

REVISIONS:

REVISIONS	DATE	APPROVED	BY
1. UPDATE	5/20/03	<i>[Signature]</i>	SS-7
2. UPDATE	5/15/04	<i>[Signature]</i>	SS-7

CITY OF LINCOLN
DEPARTMENT OF PUBLIC WORKS

SEWER TRENCH DETAIL

SCALE: NONE
DATE: AUGUST 1998
DRAWN BY: L.M.

SS-7

REVISIONS:

REVISIONS	DATE	APPROVED	BY
1. UPDATE	5/20/03	<i>[Signature]</i>	SS-11
2. UPDATE	5/15/04	<i>[Signature]</i>	SS-11

CITY OF LINCOLN
DEPARTMENT OF PUBLIC WORKS

SEWER TEE DETAIL

SCALE: NONE
DATE: AUGUST 1998
DRAWN BY: L.M.

SS-11

REVISIONS:

REVISIONS	DATE	APPROVED	BY
1. UPDATE	5/20/03	<i>[Signature]</i>	SS-12
2. UPDATE	5/15/04	<i>[Signature]</i>	SS-12

CITY OF LINCOLN
DEPARTMENT OF PUBLIC WORKS

SEWER LATERAL DETAIL

SCALE: NONE
DATE: AUGUST 1998
DRAWN BY: L.M.

SS-12

DATE: DMO

DRAWN BY: HUC

CHECKED BY: HUC

PROJECT NO: 204-724-01

DATE: 09-29-14

SHEET NO.


8

CITY OF LINCOLN
2004 IMPROVEMENT STANDARDS
CONSTRUCTION DETAILS

CLOSED LINCOLN LANDFILL

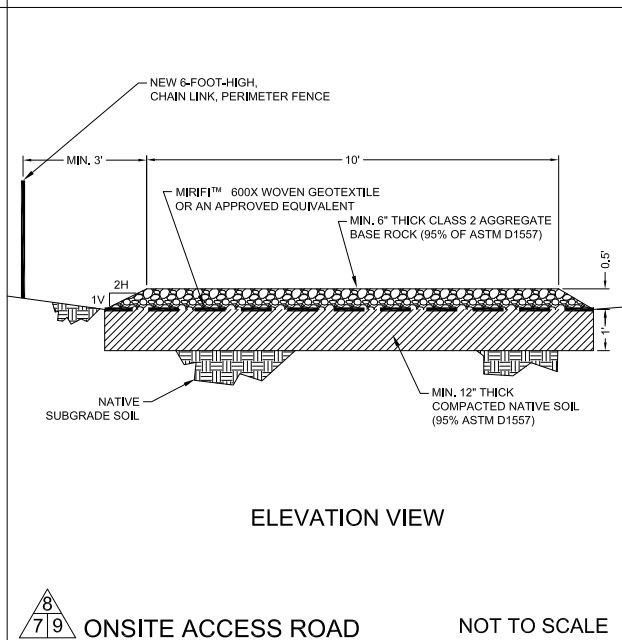
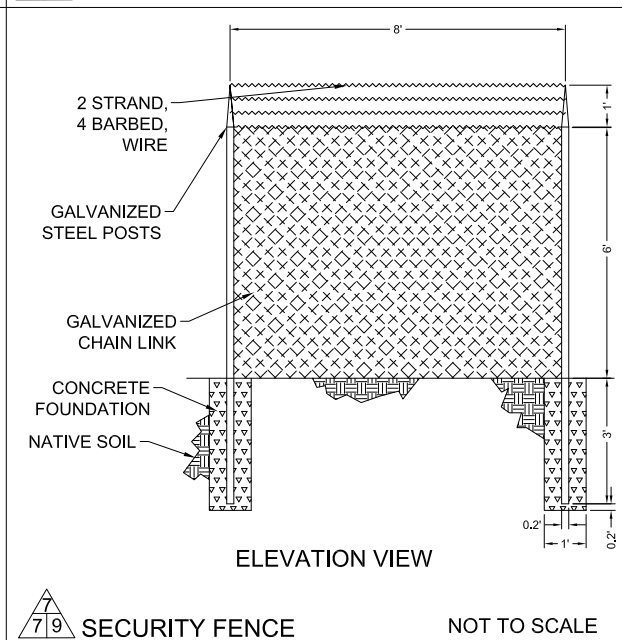
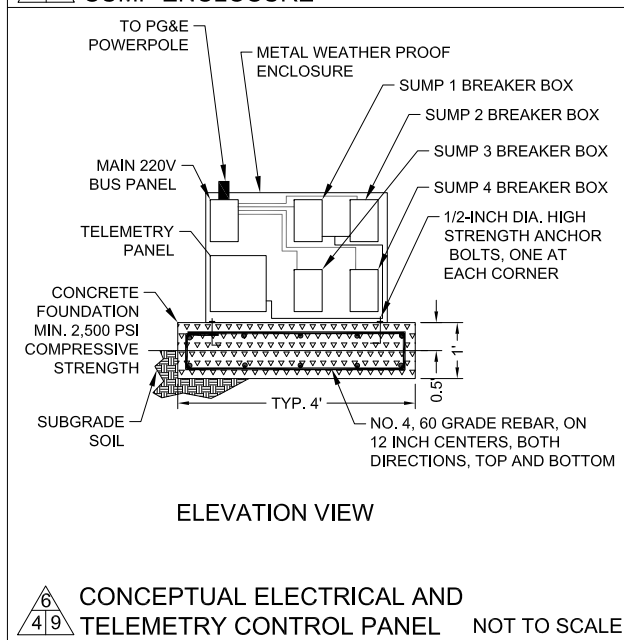
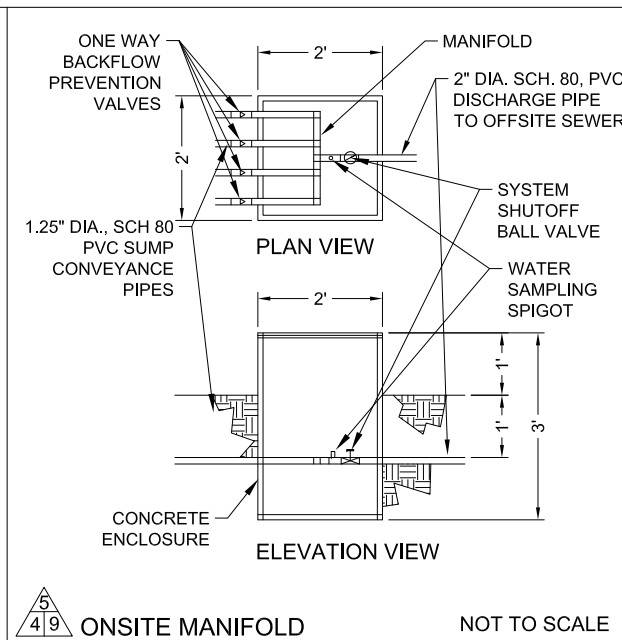
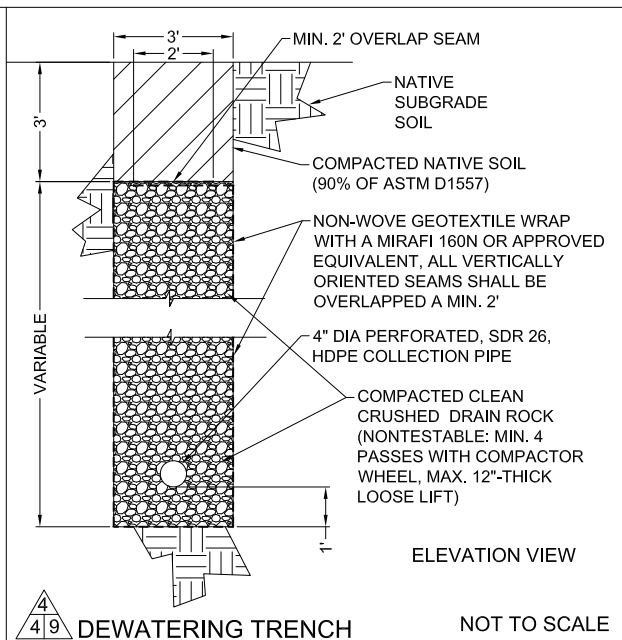
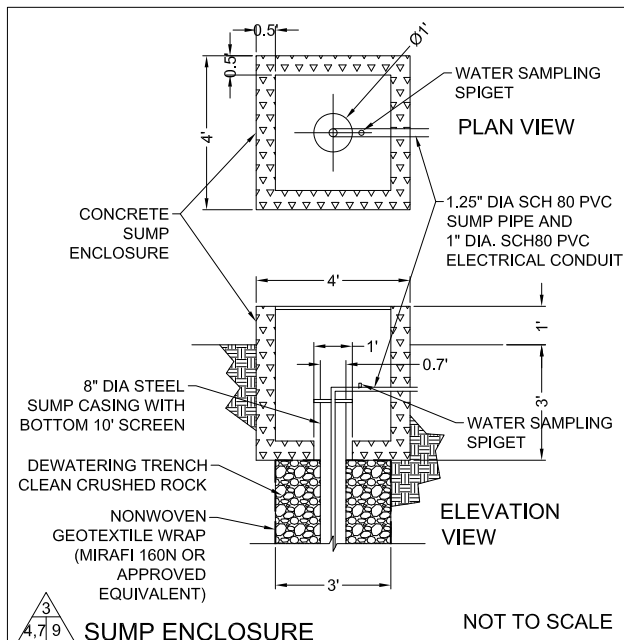
Virginia Road and Hungry Hollow Road

Lincoln, Placer County, California



H. K. HOLDRIDGE & KULL
Professional Engineers - California
Civil Engineering
Office: 2000 South 100
PH: 530-848-2487 FAX: 530-848-2427

704724-01_14-0925_DWG-S.DWG



CITY OF LINCOLN STANDARD NOTES

1. THE CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR THE JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS. THE CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD THE CONSULTING ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE CONSULTING ENGINEER.
2. ALL MATERIALS, METHODS AND WORKMANSHIP SHALL CONFORM TO THE CURRENT CITY OF LINCOLN (CITY) DEPARTMENT OF PUBLIC WORKS PUBLIC FACILITIES IMPROVEMENT STANDARDS (JUNE 2004) OR THE LATEST EDITION, OR MOST CURRENT STANDARDS WHEN APPROVED. ALL WORK IS SUBJECT TO APPROVAL OF THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE. CERTIFICATION FOR CONFORMANCE WITH CITY SPECIFICATIONS WILL BE REQUIRED FOR ALL MATERIALS USED ON THE PROJECT UNLESS SPECIFICALLY WAIVED BY THE CITY ENGINEER.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE CITY OF LINCOLN ENGINEERING DEPARTMENT FOR A PRE-CONSTRUCTION CONFERENCE 48 HOURS IN ADVANCE OF ANY CONSTRUCTION ACTIVITIES. ALSO, THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING 48 HOURS PRIOR TO COMMENCING WORK AND 24 HOURS PRIOR TO RESUMPTION AFTER INTERRUPTION, REQUESTS FOR INSPECTION OF PUBLIC FACILITIES SHALL BE GIVEN 48 HOURS IN ADVANCE, AND BE PERFORMED BY THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE.
4. THE CITY SHALL BE NOTIFIED 72 HOURS IN ADVANCE AND PROVIDED WITH A WORKPLAN PRIOR TO CONNECTING TO EXISTING PUBLIC INFRASTRUCTURE.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF EXISTING PUBLIC AND PRIVATE IMPROVEMENTS WITHIN THE WORK AREA AND SHALL ADEQUATELY BARRIAGE THE PROJECT TO KEEP THE GENERAL PUBLIC FROM THE SITE. ANY DAMAGE TO CITY OR PRIVATE IMPROVEMENTS SHALL BE REPLACED BY THE CONTRACTOR.
6. THE TYPES, LOCATIONS, SIZES, AND/OR DEPTHS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE PLANS WERE OBTAINED FROM SOURCES OF VARYING RELIABILITY. THE CONTRACTOR IS CAUTIONED THAT ONLY ACTUAL EXCAVATION WILL REVEAL THE TYPES, EXIST SIZE, LOCATION AND DEPTH OF SUCH UNDERGROUND UTILITIES. A REASONABLE EFFORT HAS BEEN MADE TO LOCATE ALL UNDERGROUND FACILITIES. HOWEVER, THE CONSULTING ENGINEER CAN ASSUME NO RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF ITS DELINEATION OF SUCH UNDERGROUND FACILITIES OR FOR THE EXISTENCE OF OTHER BURIED OBJECTS WHICH MAY BE ENCOUNTERED BUT WHICH ARE NOT SHOWN ON THESE PLANS. IF NO ELEVATION IS SHOWN ON THE PLANS THE CONTRACTOR SHALL ASSUME THE ELEVATION TO BE UNKNOWN.
7. THE CONTRACTOR IS TO EXPOSE THE END OF EXISTING GRAVITY SEWER LINE FOR SURVEYOR TO VERIFY LOCATION AND DEPTH OF FACILITIES PRIOR TO CONNECTION OF PROPOSED UTILITY. ALL COSTS FOR SUCH EXCAVATION SHALL BE INCLUDED IN PRICES FOR VARIOUS ITEMS OF WORK.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPORTING ALL CONFLICTS, ERRORS, OMISSIONS, ETC. TO THE CONSULTING ENGINEER IMMEDIATELY UPON DISCOVERY. IF SO DIRECTED BY THE ENGINEER OR CITY ENGINEER, THE CONTRACTOR SHALL STOP WORK UNTIL MITIGATION CAN BE MADE. ANY COSTS INCURRED RESULTING FROM THE CONTRACTOR'S FAILURE TO STOP WORK AS DIRECTED SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
9. THE CONTRACTOR SHALL AT ALL TIMES COORDINATE HIS WORK WITH THAT OF OTHERS ON THE SITE. THE CONTRACTOR SHALL HAVE ON THE JOB SITE DURING WORKING HOURS A RESPONSIBLE PARTY, WHO SHALL HAVE THE AUTHORITY AND ACT FOR THE EXISTENT AND ACT FOR THE CONTRACTOR.
10. THE CONTRACTOR SHALL BE HELD RESPONSIBLE TO SEE THAT ALL SUBCONTRACTORS AND SUPPLIERS HAVE CURRENT CITY BUSINESS LICENSES. THE WORK WILL NO BE ACCEPTED FOR COMPLETION UNTIL SUBMITTAL OF A COMPLETE LIST OF ALL SUBCONTRACTORS WITH LICENSE NUMBERS TO THE CITY.
11. THE CONTRACTOR SHALL MAKE A GOOD FAITH EFFORT TO RETAIN AND USE LOCAL VENDORS, SUPPLIERS, SUBCONTRACTORS AND LABOR, PROVIDED THEIR FEES ARE REASONABLE AND COMPETITIVE WITH COMPANIES THAT ARE NOT LOCAL.
12. ALL CONTRACTORS USING TEMPORARY "HAUL AWAY" TYPE CONTAINERS OR TEMPORARY SANITARY FACILITIES SHALL BE RESPONSIBLE FOR THE BUSINESS LICENSES FOR USE OF SUCH FACILITIES.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ALL CURRENTLY APPLICABLE SAFETY LAWS OF ANY JURISDICTION BODY OR GOVERNING AGENCIES. SAFETY INFORMATION CAN BE OBTAINED FROM THE CALIFORNIA STATE INDUSTRIAL SAFETY DEPARTMENT AT 916-455-5818.
14. THE CONTRACTOR SHALL DELIVER ALL CONSTRUCTION RELATED REFUSE COLLECTED IN DEBRIS BOXES TO THE WESTERN PLACER WASTE MANAGEMENT AUTHORITY MATERIAL RECOVERY FACILITY.
15. THE CITY OF LINCOLN DEPARTMENT OF PUBLIC SERVICES IS REQUIRING A THREE (3) YEAR WARRANTY ON ALL STREETS THAT ARE CONSTRUCTED OR PORTION OF STREETS THAT ARE RECONSTRUCTED DUE TO INSTALLATION OF UNDERGROUND UTILITIES BENEATH THE STREETS FOR PROJECT NEEDS DURING THE RAINY SEASON (OCTOBER 1 THROUGH MARCH 31).
16. ALL TRENCHES THAT ARE EXCAVATED WITHIN THE CITY RIGHT-OF-WAY AND PUBLIC UTILITY EASEMENT (PUE) WILL NOT BE ALLOWED TO REMAIN OPEN WHEN UNATTENDED, OVERNIGHT AND/OR ON WEEKENDS.
17. THE CONTRACTOR SHALL SUBMIT A TRAFFIC PLAN TO THE CITY ENGINEER FOR APPROVAL THAT DESCRIBES ALL OFF SITE STREET ROUTES TO AND FROM THE SITE TO BE USED BY CONSTRUCTION VEHICLES.
- EARTHWORK
1. HOLDREGE & KULL (HK) SHALL PROVIDE FULL TIME CONSTRUCTION OBSERVATION AND MATERIAL TESTING ENGINEERING SERVICES FOR ALL EARTH MATERIALS FOR THE ENTIRE DURATION OF THE CONSTRUCTION PROJECT. HK&K WILL CONTRACT DIRECTLY WITH THE CITY AND SERVE AS THE CITY'S REPRESENTATIVE FOR ALL GEOTECHNICAL ENGINEERING ISSUES.
2. ALL COMPACTION TESTING OF EARTH MATERIALS SHALL BE PERFORMED BY A REPRESENTATIVE OF HK&K WHO WILL BE UNDER THE DIRECTION OF AN HK&K CALIFORNIA REGISTERED ENGINEER. ALL MATERIAL COMPACTION TESTING WILL BE PERFORMED IN ACCORDANCE WITH THE SPECIFICATIONS DESCRIBED HEREIN.
3. ALL UNSUITABLE AND SURPLUS MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE UNLESS SPECIFIED OTHERWISE BY THE CITY ENGINEER.
4. THE CONTRACTOR SHALL KEEP ON SITE AT ALL TIMES DURING CONSTRUCTION SUFFICIENT EQUIPMENT TO PROVIDE NECESSARY DUST CONTROL AS DETERMINED BY THE CITY ENGINEER OR HIS REPRESENTATIVE. THE CONTRACTOR SHALL KEEP CLEAR ALL AREAS SURROUNDING THE ACTIVE WORK AREA AND SHALL BE RETURNED TO THE ORIGINAL CONDITIONS UPON COMPLETION OF THE CONTRACTED WORK.
5. THE IN PLACE (FIELD) MOISTURE CONTENT AND UNIT WEIGHT (DENSITY) OF COMPACTED ENGINEERED FILLS SHALL BE DETERMINED BY PERFORMING ASTM D6938 (SHALLOW NUCLEAR) METHOD. THE MAXIMUM DRY UNIT WEIGHT AND OPTIMUM MOISTURE CONTENT OF THE COMPACTED ENGINEERED FILL SOIL SHALL BE DETERMINED BY THE ASTM D1557 LABORATORY METHOD. THE RELATIVE PERCENT COMPACTION SHALL THEN BE COMPUTED FROM THE RESULTS OF THE D6938 AND D1557 TEST RESULTS.
6. ALL TESTABLE EARTH MATERIALS SHALL BE COMPACTED TO ACHIEVE A MINIMUM RELATIVE COMPACTION OF 90 PERCENT OF THE AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) D1557 MAXIMUM DRY DENSITY WITH THE MOISTURE CONTENT WITHIN ± 4 PERCENTAGE POINTS OF THE ASTM D1557 OPTIMUM MOISTURE CONTENT.
7. ALL NONTESTABLE MATERIALS AS DETERMINED BY ASTM D4718 ARE GENERALLY SOIL AND ROCK MATERIAL MIXTURES OR ROCK ONLY MATERIALS WHICH CONSIST OF LESS THAN OR EQUAL TO 40 PERCENT OF THE MATERIAL BY DRY WEIGHT IS RETAINED ON THE NO. 4 sieve AND/OR LESS THAN OR EQUAL TO 30 PERCENT OF THE MATERIAL IS RETAINED ON THE NO. 20 INCH sieve. NONTESTABLE MATERIALS WILL BE EVALUATED BY A PERFORMANCE BASED METHOD CONSISTING OF RECORDING THE NUMBER OF COMPACTION OVER EACH LOOSE LIFT OVER EACH LOOSE LIFT OF MATERIAL, MAINTAINING A MAXIMUM LOOSE LIFT THICKNESS, AND OBSERVING THE MOISTURE CONDITIONING OF THE MATERIAL. GENERALLY, THE PERFORMANCE METHODOLOGY WILL ENTAIL: 1) A MINIMUM OF 4 PASSES OF THE COMPACTION EQUIPMENT OVER EACH LOOSE LIFT (LAYER); 2) MAXIMUM 8-INCH-THICK LOOSE LIFT (LAYER); AND 3) MOISTURE CONTENT NEAR THE OPTIMUM BASED ON VISUAL OBSERVATIONS.
8. THE TRENCH BACKFILL MATERIAL SHALL CONSIST OF A 1-INCH MINUS CLEAN CRUSHED DRAIN ROCK (TYPE G) TO WITHIN 3 FEET OF THE FINISHED GRADE SURFACE. THE CRUSHED ROCK SHALL BE WASHED TO PROVIDE AN ASTM D422 TEST PARTICLE SIZE DISTRIBUTION OF 100 PERCENT BY DRY WEIGHT PASS THE 1/8 INCH MESH SIEVE AND 0 TO 5 PERCENT PASSING THE NO. 4 MESH SIEVE; AND 0 TO 3 PERCENT PASSING THE NO. 200 MESH SIEVE. THIS MATERIAL WILL BE CONSIDERED TO BE NONTESTIBLE AND WILL BE EVALUATED BY THE PERFORMANCE BASED METHODS.

9. THE UPPERMOST 3 FEET OF TRENCH BACKFILL WILL CONSIST OF ONSITE NATIVE SOIL OR AN APPROVED IMPORT SOIL. THE SOIL PLACED AND COMPACTED IN THIS PORTION OF THE TRENCH WILL BE CONSIDERED TO BE TESTABLE SOIL MATERIAL. ALL OTHER MINOR FILLS TO BE PLACED AND COMPACTED AT THE SITE WILL BE EVALUATED AS TESTABLE MATERIALS. THE UPPERMOST THREE FEET WILL BE COMPACTED TO ACHIEVE A MINIMUM RELATIVE COMPACTION OF 90 PERCENT OF THE ASTM D1557 MAXIMUM DRY UNIT WEIGHT WITH A MOISTURE CONTENT OF 4 PERCENTAGE POINTS OF THE ASTM D1557 OPTIMUM MOISTURE CONTENT.
10. THE NEW GRAVEL PERIMETER ACCESS ROAD WILL BE GRADED USING A CLASS 2 AGGREGATE BASE (AB) ROCK MATERIAL. THE AB ROCK WILL BE COMPACTED TO ACHIEVE A MINIMUM RELATIVE COMPACTION OF 95 PERCENT OF THE ASTM D1557 MAXIMUM DRY UNIT WEIGHT WITH A MOISTURE CONTENT OF 4 PERCENTAGE POINTS OF THE ASTM D1557 OPTIMUM MOISTURE CONTENT.
11. PRIOR TO PLACING THE CLASS 2 AB ROCK, THE NATIVE SUBGRADE SOIL SHALL BE SCARIFIED A MINIMUM OF 12 INCHES DEEP, THEN MOISTURE CONDITIONED AND COMPACTED TO ACHIEVE A MINIMUM RELATIVE COMPACTION OF 95 PERCENT OF THE ASTM D1557 MAXIMUM DRY UNIT WEIGHT WITH A MOISTURE CONTENT OF 4 PERCENTAGE POINTS OF THE ASTM D1557 OPTIMUM MOISTURE CONTENT.
12. SOIL SPOOLS GENERATED DURING EXCAVATION OF THE PERIMETER DEWATERING TRENCH, THE OFFSITE CONVEYANCE PIPE TRENCH, SUMP STRUCTURES AND ANY OTHER CONSTRUCTION ACTIVITIES WILL BE DISPOSED AT AN APPROPRIATELY PERMITTED FACILITY. WASTE PROFILING WILL BE CONDUCTED IN ACCORDANCE WITH THE PERMITTED FACILITY REQUIREMENTS. THE FOLLOWING FACILITIES HAVE BEEN IDENTIFIED FOR WASTE DISPOSAL ACTIVITIES:
- NONHAZARDOUS WASTES MAY BE DISPOSED AT THE CLASS 2 RECYCLOGY OSTROM ROAD SANITARY LANDFILL, LOCATED IN WHEATLAND, CALIFORNIA. THIS SITE IS APPROXIMATELY 20 MILES FROM THE PROJECT SITE. WASTE ACCEPTANCE CRITERIA (I.E., SAMPLES QUANTITIES AND LABORATORY ANALYSES) ALONG WITH THEIR WASTE DISPOSAL APPLICATION ARE POSTED ON THEIR WEB SITE AT: <http://www.recologystromroad.com/>.
 - HAZARDOUS WASTE MAY BE DISPOSED AT THE CHEMICAL WASTE MANAGEMENT FACILITY LOCATED IN ARBONIGHT, OREGON WHICH IS OPERATED BY WASTE MANAGEMENT, INC. THIS FACILITY IS SITUATED APPROXIMATELY 600 MILES FROM THE PROJECT SITE AND IS THE NEAREST HAZARDOUS WASTE FACILITY TO THE SITE. WASTE PROFILING AND WASTE ACCEPTANCE CRITERIA MUST BE CONFIRMED WITH WASTE MANAGEMENT, INC. THE WASTE DISPOSAL APPLICATION PROCESS IS FOUND ON THEIR WEB SITE AT: <http://www.wemidolutions.com/solutions/>.

GEOTEXTILES

1. A NON-WOVEN GEOTEXTILE SUCH AS A TENCATE MIRAFI 160N OR AN APPROVED EQUIVALENT SHALL BE USED TO WRAP THE CLEAN CRUSHED ROCK THAT IS PLACED AND COMPACTED IN THE PERIMETER DEWATERING TRENCH.
2. A WOVEN GEOTEXTILE SUCH AS A TENCATE MIRAFI 600X OR AN APPROVED EQUIVALENT SHALL BE PLACED ON THE COMPACTED SUBGRADE SOIL PRIOR TO PLACING AND COMPACTING THE CLASS 2 AB ROCK ON THE PERIMETER ACCESS ROAD.

PLASTIC PIPES

1. DEWATERING TRENCH PIPE: A MINIMUM 1/4-INCH-DIAMETER, PERFORATED, HIGH DENSITY POLYETHYLENE (HDPE), SDR-26, PIPE SHALL BE PLACED ON A MINIMUM OF 12-INCHES OF CLEAN CRUSHED ROCK ON THE BOTTOM OF EACH TRENCH AND ACT FOR THE EXISTENT AND ACT FOR THE CONTRACTOR. THE BOTTOM OF EACH TRENCH SHALL BE GRADED TO A MINIMUM OF 2 PERCENT FALL TOWARDS THE RESPECTIVE SUMP.
2. THE PIPE SHALL BE PERFORATED BY DRILLING 1/4-INCH DIAMETER HOLES IN SETS OF FOUR PERFORATIONS ORIENTED AT 90 DEGREES TO ONE ANOTHER ON 12 INCH CENTERS ALONG THE AXIS OF THE PIPE.
3. ONSITE SUMP AND CONVEYANCE PIPES: THE SUMP PIPE AND ONSITE CONVEYANCE COLLECTION PIPES SHALL BE A 1.25-INCH-DIAMETER (ODD), POLYVINYLCHLORIDE (PVC), SCHEDULE 80, PIPE.
4. ALL GLUED JOINTS SHALL BE SEALED WITH THE MANUFACTURERS RECOMMENDED ADHESIVE. ALL THREADED JOINTS SHALL BE SEALED WITH TEFLON TAPE OR PLUMBERS PUTTY.
5. OFFSITE CONVEYANCE PIPES: ALL OFFSITE CONVEYANCE PIPING SHALL CONSIST OF 2-INCH OD, SCHEDULE 80, PVC, PIPES.
4. ALL GLUED JOINTS SHALL BE SEALED WITH THE MANUFACTURERS RECOMMENDED ADHESIVE. ALL THREADED JOINTS SHALL BE SEALED WITH TEFLON TAPE OR PLUMBERS PUTTY.
5. SANITARY SEWER CONNECTION: THE EXISTING SANITARY SEWER CONNECTION MAY BE VITRIFIED CLAY PIPE (VCP), CLEAN OUT OR A STANDARD CONCRETE MANHOLE. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE METHOD OF CONNECTION THE OFFSITE 2-INCH-DIAMETER, PVC, CONVEYANCE PIPE TO THE EXISTING SANITARY SEWER.

SUMP STRUCTURES

1. SUMP CASINGS: A MINIMUM 1/4-INCH-DIAMETER, 0.25-INCH-THICK WALL, SOLID LOW-CARBON STEEL CASING WITH WELDED COLLARS WILL BE INSTALLED AT EACH OF THE FOUR SUMP LOCATIONS.
2. THE BOTTOM 10 FEET OF THE SUMP CASING WILL BE A TYPE 304 SS Wn, 0.040 INCH WIRE WRAP STAINLESS STEEL SCREEN WITH WELDED COLLARS TO ALLOW GROUND WATER TO READILY FLOW INTO THE CASING WHEN PUMPED BY THE INSTALLED SUMP PUMPS
3. SUMP PUMPS: INSTALLED IN EACH SUMP WILL BE A VARIABLE DISCHARGE GRUNDFOS RED-FLO3, 220 VOLT PUMP. THE DISCHARGE FROM EACH PUMP CAN BE ADJUSTED FROM APPROXIMATELY 2 TO 30 GALLONS PER MINUTE (GPM). THE PUMP CONNECTS DIRECTLY TO THE 1.25-INCH OD THREADED PIPE.
4. SUMP ENCLOSURE: A 4-FOOT SQUARE BY 4-FOOT TALL CONCRETE ENCLOSURE WILL BE INSTALLED AT THE TOP OF EACH SUMP CASING
5. SUMP CONTROLS: EACH SUMP PUMP WILL BE CONNECTED TO A STEEL WEATHERPROOF CENTRAL ELECTRICAL CONTROL PANEL. THE PANEL WILL BE EQUIPPED WITH TELEMETRY THAT WILL ALLOW THE CITY PERSONNEL TO MONITOR THE PERFORMANCE OF EACH SUMP PUMP. A 220 VOLT ELECTRICAL BUS AND MASTER BREAKER WILL BE INSTALLED IN THE CONTROL BOX ENCLOSURE. EACH PUMP WILL HAVE A INDIVIDUAL CIRCUIT BREAKER BOX THAT WILL BE CONNECTED TO THE MASTER BREAKER BUS TERMINAL. A GRINDER/BUS 02 M-301 REMOTE MODULE M-301 WILL ALSO BE INSTALLED ON THE CONTROL PANEL. THE M-301 USES BUILT IN INFRARED AND RADIO TRANSMISSION EQUIPMENT TO RECORD AND TRANSMIT WATER LEVEL DATA RECORDED BY THE PRESSURE TRANSDUCERS INSTALLED IN EACH WELL.
6. THE STEEL WEATHERPROOF ENCLOSURE SHALL BE INSTALLED ON A STEEL REINFORCED CONCRETE SLAB AND ATTACHED TO THE SLAB BY HIGH STRENGTH BOLTS WITH WASHER AND NUT ASSEMBLIES AT EACH OF THE FOUR CORNERS OF THE SLAB.
7. ELECTRICAL POWER SOURCE: A PG&E POLE IS TO BE INSTALLED ON SITE TO ALLOW PG&E TO PROVIDE POWER TO THE SITE. THE SUMP PUMPS WILL ALL REQUIRE 220 VOLTS.

SECURITY FENCE

1. THE EXISTING SECURITY FENCE SHALL BE ENTIRELY REMOVED AND DISPOSED.
2. THE NEW SECURITY FENCE SHALL BE A MINIMUM OF 6 FEET HIGH AND CONSTRUCTED WITH COMMERCIAL QUALITY MATERIALS.
3. ALL FENCE COMPONENTS SHALL BE GALVANIZED COATED.
4. THE FENCE COMPONENTS SHALL CONSIST OF 2-INCH CHAIN LINK, 9 GAUGE MESH PANELS WITH 2-3/4-INCH DIAMETER, 20 GAUGE, POLES, TOP AND BOTTOM RAILS.
5. THE TOP OF THE FENCE SHALL BE EQUIPPED WITH BARB ARMS TO MOUNT A MINIMUM OF 4 STRANDES OF 4-POINT BARBED, 12 GAUGE, WIRE.
6. FOUR LOCKING SECURITY GATES SHALL BE INSTALLED. EACH GATE SHALL HAVE DOUBLE DOORS AND BE A MINIMUM OF 12-FEET WIDE AND 6-FEET-HIGH.

REVISIONS:	DATE:	DRAWN BY:	DWG	SHEET NO.
	CHECKED BY:	HJC		
	PROJECT NO:	70472A-01		10
	DATE:	09-29-14		

H&K CONSTRUCTION NOTES

CLOSED LINCOLN LANDFILL
Virgintatown Road & Hungry Hollow Road
Lincoln, Placer County, California



H&K HOLDREGE & KULL
Construction Engineers & Geologists
10000 Old River Road, Suite 100
Oakland, CA 94643
PH: 510-864-2487 FAX: 510-864-2427